DIGITAL PROJECTION

HIGHlite Cine 260 HB, HC

HIGHlite 1080p 330

High Brightness Digital Video Projector
16:9 widescreen display

User Manual

Rev B July 2011 *111-367B*

Declaration of Conformity

Directives covered by this Declaration

2004/108/EC Electromagnetic Compatibility Directive.

2006/95/EC Low Voltage Equipment Directive.

Products covered by this Declaration

Large screen video projector type	*The CE mark was first applied in:*
HIGHlite Cine 260	June 2010
HIGHlite 1080p 330	June 2011

Basis on which Conformity is being declared

The products identified above comply with the protection requirements of the above EU directives, and the manufacturer has applied the following standards.

EN 55022:1998 - Limits and Methods of Measurement of Radio Disturbance Characteristics of Information Technology Equipment.

EN 55024:1998 - Limits and Methods of Measurement of Immunity Characteristics of Information Technology Equipment.

EN 60950-1:2001 - Specification for Safety of Information Technology Equipment, including Electrical Business equipment.

The technical documentation required to demonstrate that the products meet the requirements of the Low Voltage directive has been compiled by the signatory below and is available for inspection by the relevant enforcement authorities.

Signed:

Authority: D.J. Quinn, Product Development Director

Date: 15 June 2011

Attention!

The attention of the specifier, purchaser, installer, or user is drawn to special measures and limitations to use which must be observed when these products are taken into service to maintain compliance with the above directives. Details of these special measures are available on request, and are also contained in the product manuals.

Important Information

Please read this user manual carefully before using the projector, and keep the manual handy for future reference.

A serial number is located on the back of the projector. Record it here:

Symbols used in this guide

Warnings

ELECTRICAL WARNING: this symbol indicates that there is a danger of electrical shock unless the instructions are closely followed.

WARNING: this symbol indicates that there is a danger of physical injury to yourself and/or damage to the equipment unless the instructions are closely followed.

NOTE: this symbol indicates that there is some important information that you should read.

Trademarks

- IBM is a registered trademark of International Business Machines Corporation.
- Macintosh and PowerBook are registered trademarks of Apple Computer, Inc.
- Other product and company names mentioned in this user's manual may be the trademarks of their respective holders.

Product revision

- Because we at Digital Projection continually strive to improve our products, we may change specifications and designs, and add new features without prior notice. Projectors built prior to this revision of the User Manual may therefore not include all the features described.

Manual revision

Date	Description	Revision
December 2010		Rev A
July 2011	addition of 1080p 330	Rev B

General precautions

Do not open the cabinet. There are no user serviceable parts inside.

Use only the power cable provided.

Ensure that the power outlet includes a Ground connection, as this equipment MUST be earthed.

Take care to prevent small objects such as paper or wire from falling into the projector. If this does happen, switch off immediately, and have the objects removed by authorised service personnel.

Do not expose the projector to rain or moisture, and do not place any liquids on top of the projector.

Unplug before cleaning, and use a damp, not wet, cloth.

Do not touch the power plug with wet hands.

Do not touch the power plug during a thunder storm.

Handle the power cable carefully and avoid sharp bends. Do not use a damaged power cable.

There are no user-serviceable parts inside the lamp module. The whole module should be replaced.

Only lamps supplied by Digital Projection and intended for this projector should be used. Fitting any other lamp could damage both projector and lamp, and will invalidate the warranty.

Take care when removing the lamp module.

NEVER touch the lamp or reflector.

Take care not to touch the glass surface of the lamp module. If you do accidentally touch the glass, it should be cleaned before use. (see section 5. Maintenance.)

Do not use the lamp for more than 2000 hours, as this may cause serious lamp failure, damage the lamp module and cause extra cost on replacement.

HID lamps produce high intensity light. Do not look directly at the light coming from the lamp housing, or the lens, or allow items such as magnifying lenses to be placed in the light path. This could result in serious eye damage.

Do not touch the ventilation outlets, as they will become hot in use.

Do not cover or obstruct the ventilation outlets or inlets.

Do not cover the lens whilst the projector is switched on. This could cause a fire

Always allow the projector to cool for 5 minutes before disconnecting the power, moving the projector, changing the lamp or cleaning the fans or filter.

Never use strong detergents or solvents such as alcohol or thinners to clean the projector and lens.

Notes

Installation precautions

The projector must be installed only by suitably qualified personnel, in accordance with local building codes.

The projector should be installed as close to the power outlet as possible.

The power connection should be easily accessible, so that it can be disconnected in an emergency.

Ensure that there is at least 30cm (12in) of space between the ventilation outlets and any wall, and 10cm (4in) on all other sides.

Do not install the projector close to anything that might be affected by its operational heat, for instance, polystyrene ceiling tiles, curtains etc.

The projector weighs approximately 20 kg (44 lbs). Use safe handling techniques when lifting the projector.

Do not stack more than three projectors.

When stacking projectors, the stack MUST be vertical, to ensure that the stresses are distributed to all four chassis corners.

Before installation, make sure that the surface, ceiling or rigging that is to support the projector is capable of supporting the combined weight of all the projectors.

Backup safety chains or wires should always be used with ceiling mount installations.

Do not place heavy objects on top of the projector chassis. Only the chassis corners are capable of withstanding the weight of another projector.

Do not drop or knock the projector.

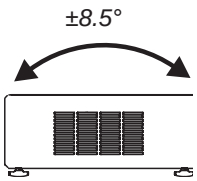
Place the projector in a dry area away from sources of dust, moisture, steam, smoke, sunlight or heat.

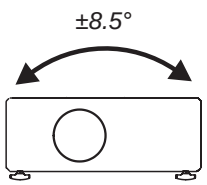
Do not tilt the projector more than ±8.5° forwards and backwards when in use, as this may cause serious lamp failure, damage the lamp module and cause extra cost on replacement. The projector my be tilted left and right as necessary.

Operation and configuration precautions

Software update should NOT be carried out except by, or with the supervision of, Digital Projection Service personnel.

Notes





Compliance with international standards

Noise

GSGV Acoustic Noise Information Ordinance

The sound pressure level is less than 35 dB (A) according to ISO 3744 or ISO 7779.

RF Interference

FCC

The Federal Communications Commission does not allow any modifications or changes to the unit EXCEPT those specified by Digital Projection in this manual. Failure to comply with this government regulation could void your right to operate this equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant with Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

European Waste Electrical and Electronic Equipment (WEEE) Directive

Digital Projection Ltd is fully committed to minimising Waste Electrical and Electronic Equipment. Our products are designed with reuse, recycling and recovery of all components in mind. To this end, at end of life, your projector may be returned to Digital Projection Ltd or its agent so that the environmental impact can be minimised.

Notes

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What's in the box?

- Make sure your box contains everything listed. If any pieces are missing, contact your dealer.
- You should save the original box and packing materials, in case you ever need to ship your Projector.

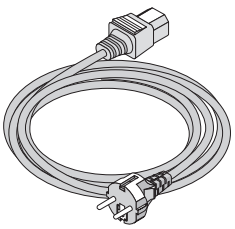
Projector

HIGHlite 260 HB (110-509)
HIGHlite 260 HC (110-016)
HIGHlite 1080p 330 (110-748)

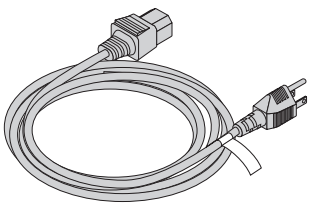
Notes

For more detailed information about lenses, see **Screen size vs throw distance**, *in* **section 2. Installation**.

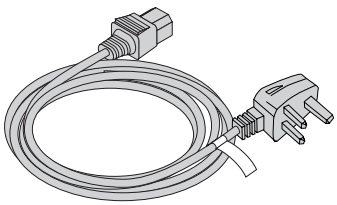
Only one power cable - dependent on the destination territory - will be supplied with the projector.



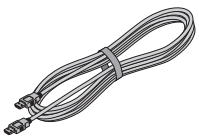
Power cable 10A Europe (102-163)



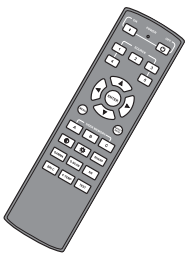
Power cable 13A North America (102-165)



Power cable 10A United Kingdom (102-180)

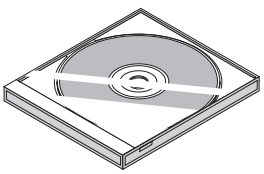


HDMI cable



Remote control (110-024)

2x AA batteries



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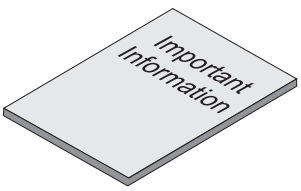

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Key features of the projector

Congratulations on your purchase of the Digital Projection HIGHlite Series projector.

Digital Projection International (DPI), Texas Instruments' first DLP® partner and the original innovator of the 3-chip DLP® projector, proudly introduces the new HIGHlite Series, a high brightness 1080p platform with the imaging fidelity of Texas Instruments' DLP® technology. The 3-chip HIGHlite Series adds a remarkably affordable, high-lumen line of 1920 x 1080 displays to DPI's already extensive 3-chip product line.

The imagery benefits associated with the HIGHlite Series are numerous, with dazzlingly bright images and superior DLP® image fidelity. Applicable to a wide variety of home and commercial venues, including those contending with high ambient light, the series offers rich, saturated imagery. Augmenting these benefits is the incredible efficiency of the single lamp, meaning the projector produces beautiful imagery while consuming a fraction of the wattage of similar products.

Installation is incredibly flexible due to the HIGHlite's compact and lightweight chassis design, and extraordinary lens shift range of up to 30% horizontal and up to 120% vertical. Multiple lens options provide further flexibility, with a throw range from .77 to 6.76:1. Connectivity includes two HDMI inputs, as well as RGB via D-15, component, composite and S-Video inputs.

Providing a bright, saturated image from a small form 3-chip display, the HIGHlite Series presents a powerful yet remarkably affordable solution for a Variety of commercial and home entertainment applications, including: media rooms and home theatres, training and education, boardrooms and conference centers, visualization/simulation environments, retail, entertainment, digital media/advertising and hospitality.

Key Features

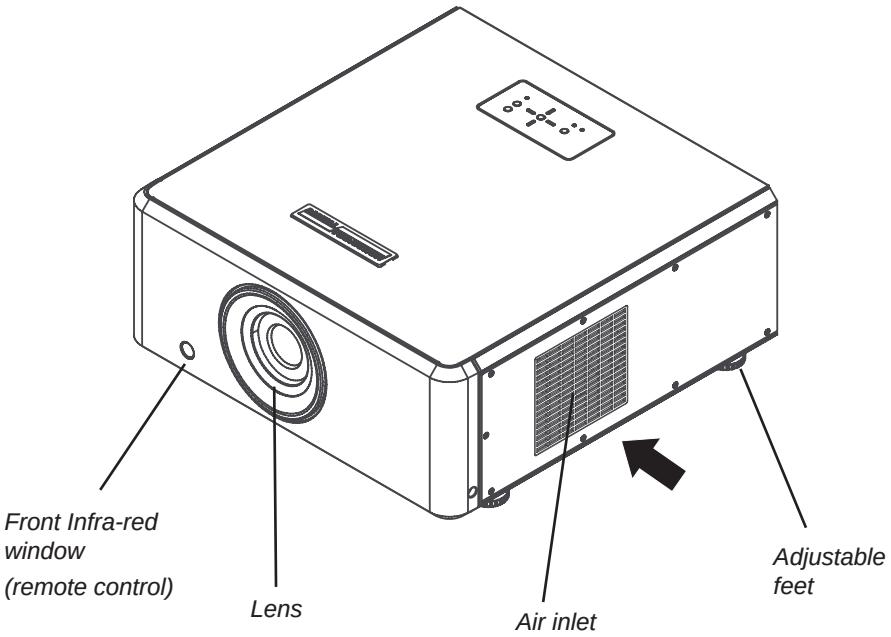
- High resolution projector for medium sized venues
- Applications: Medium sized Screen; Fixed install and Rental
- Brightness:
  - 260 HC 2000 ANSI lumens ±10%
  - 260 HB 3500 ANSI lumens ±10%
  - 1080p 330 4500 ANSI lumens ±10%
- Contrast:
  - 260 HC 20000:1 ±10% (with HC lens and Dynamic Black)
  - 260 HB 2000:1 ±10%
  - 1080p 330 2000:1 ±10%
- 1920 x 1080 resolution
- Precision mechanical design ensuring maximum amount of light from lamp housing reaches optics, without any operator adjustment
- Power consumption: 400-500W single phase, 100-240VAC ±10%
- Compact size, light weight - approximately 20 kg (44 lbs)
- Robust metal case
- RS232 and LAN connection for remote operation using control codes
- Seven selectable Digital and Analogue Video inputs for display of the latest as well as legacy video standards.

  HDMI, RGBHV, Component, S-Video, Composite all as standard
- IR remote control for easy setup

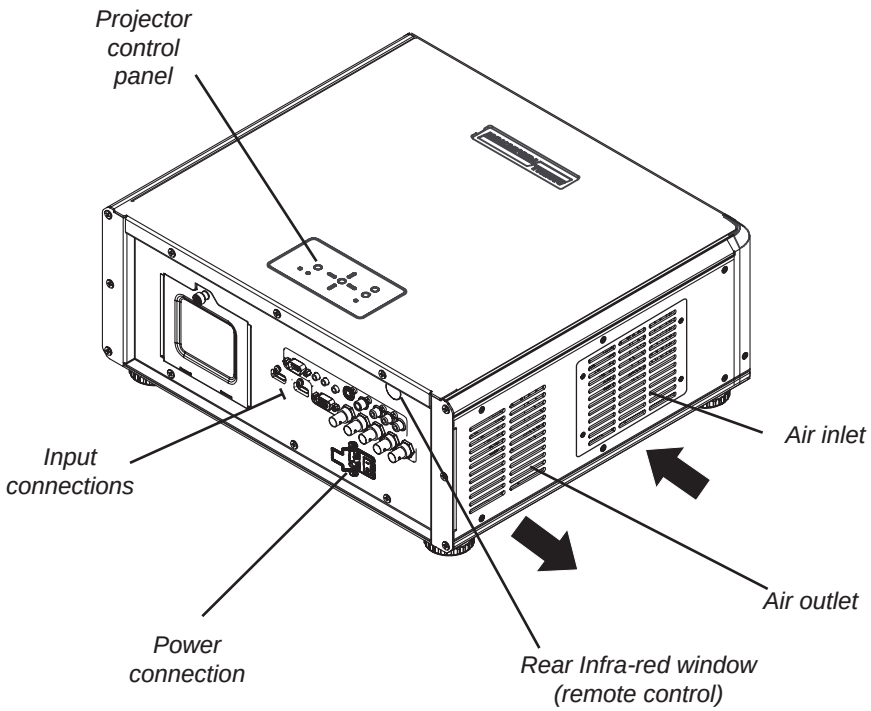
Notes

Getting to know the projector

Front view



Rear view



Notes

For more detailed information about lenses or lens shift, see **section 2. Installation**

For information about how to change the lamp or the filter, see ***section*** **5. Maintenance***.*

For information about controls and indicators, see ***section*** **4. Controlling the projector***.*

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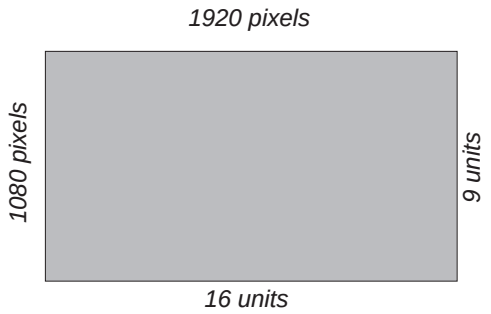
Screen requirements

Aspect ratio

Fitting the image to the DMD

The projector uses a DMD (Digital Mirror Device) to create the image that is projected onto the screen. The resolution of the DMD in this projector is 1920 x 1080 pixels, or to put it another way, its aspect ratio is 16:9.



If the source image supplied to the projector has a different aspect ratio from this, or even if it has the same aspect ratio but fewer pixels, then the image will not fill the DMD. The projector therefore needs to scale the image.

The projector has five aspect ratio settings, so that you can choose the one that is most suitable for your image source. The settings are:

16:9 the image is scaled to fill the DMD (and thus, a 16:9 screen).

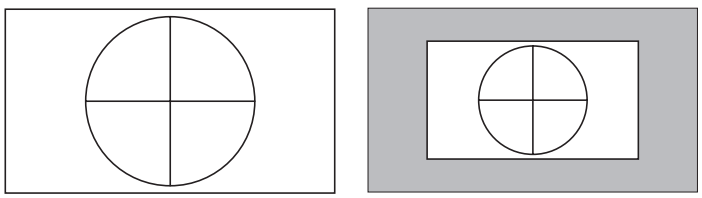
Theaterscope the image is scaled such that a 2.35:1 image will be displayed at the correct aspect ratio when the projector is fitted with an anamorphic lens. Thus an image with an aspect ratio of 2.35:1 can be displayed using the full 16:9 resolution of the DMD.

4:3 the image is scaled to fit a 4:3 screen, using the full height of the DMD.

4:3 Narrow to be used for 4:3 images in combination with an anamorphic lens. The image is scaled to fit the DMD vertically, but squeezed horizontally such that the lens will stretch it to the correct ratio.

Native the image is displayed with no scaling, at its original resolution, in the centre of the screen.

Examples of 16:9 images displayed with different aspect ratio settings



16:9 *Native*

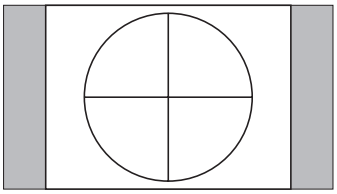
Note that, as the aspect ratio of the image matches that of the DMD, the 16:9 setting is best, unless there is some specific reason for wanting the smaller image, for instance, to maintain the same scale as other images from the same source.

Notes

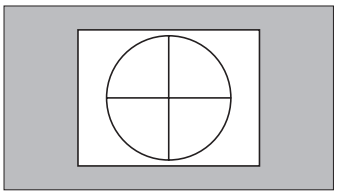
For more information about changing the **Aspect ratio** *setting, see* **Using the control keys** *and* **Using the menus** *in* **section 4. Controlling the Projector**.

The 16:9 image shown here has far fewer pixels than the 1920 x 1080 of the DMD. Your image may be different.

Examples of 4:3 images displayed with different aspect ratio settings



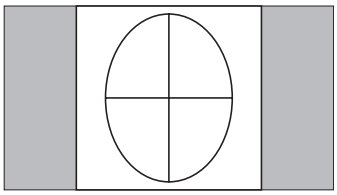
4:3



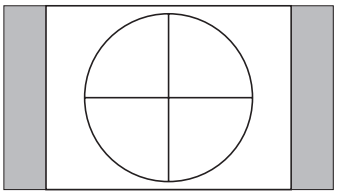
Native

The 4:3 setting is best, unless there is some specific reason for wanting the smaller Native image, for instance, to maintain the same scale as other images from the same source.

If you are using an anamorphic lens, the 4:3 Narrow setting should be used. The lens will stretch the image to the correct width.

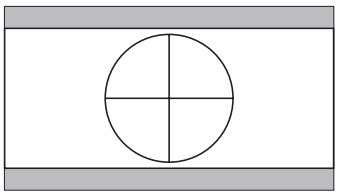


4:3 Narrow
without anamorphic lens

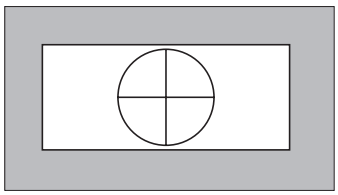


4:3 Narrow
with anamorphic lens

Examples of 2.35:1 images displayed with different aspect ratio settings



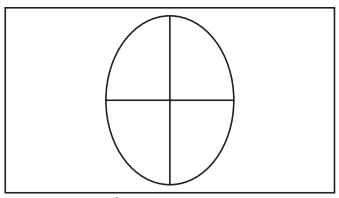
16:9



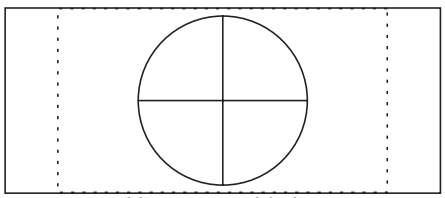
Native

The 16:9 setting is best, unless there is some specific reason for wanting the smaller Native image, for instance, to maintain the same scale as other images from the same source.

If you have an anamorphic lens, the Theaterscope setting would be a much better option. Because it uses the whole of the DMD, it will be a much brighter image than the letterboxed options shown above, and will fill a wider screen if this is available.



Theaterscope
without Anamorphic lens



with Anamorphic lens,
stretched to fill wider screen

Notes

The 4:3 image shown here has far fewer pixels than the 1920 x 1080 of the DMD. Your image may be different.

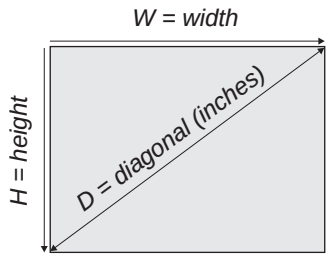
If you are using an anamorphic lens, you will need to use the 4:3 Narrow setting to correct the image.

The 2.35 image shown here has far fewer pixels than the 1920 x 1080 of the DMD. Your image may be different.

To take advantage of the Theaterscope setting, you MUST have an anamorphic lens.

Diagonal screen sizes

Screen sizes are sometimes specified by their diagonal size (D) in inches. When dealing with large screens and projection distances at different aspect ratios, it is more convenient to measure screen width (W) and height (H).



The example calculations below show how to convert diagonal sizes in inches into width and height, at various aspect ratios.

2.35:1 (Scope)
W = D x 0.92in (D x .023m) ***H*** = D x 0.39in (D x .01m)

1.85:1
W = D x 0.88in (D x .022m) ***H*** = D x 0.47in (D x .012m)

16:9 = 1.78:1 (native aspect ratio)
W = D x 0.87in (D x .022m) ***H*** = D x 0.49in (D x .0125m)

1.66:1 (Vista)
W = D x 0.86in (D x .022m) ***H*** = D x 0.52in (D x .013m)

16:10 = 1.6:1
W = D x 0.85in (D x .022m) ***H*** = D x 0.53in (D x .014m)

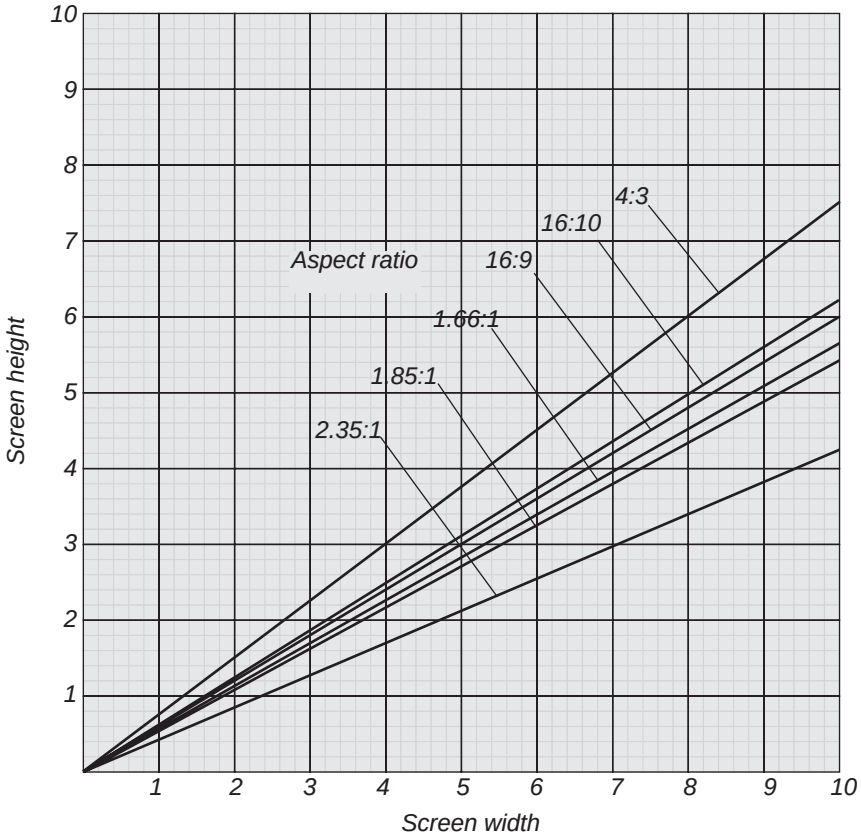
4:3 = 1.33:1
W = D x 0.8in (D x .02m) ***H*** = D x 0.6in (D x .015m)

Notes

Fitting the image to the screen

It is important that your screen is of sufficient height and width to display images at all the aspect ratios you are planning to use.

Use the conversion chart, or the sample calculations below to check that you are able to display the full image on your screen. If you have insufficient height or width, you will have to reduce the overall image size in order to display the full image on your screen.



2.35:1 (Scope)
W = H x 2.35 ***H*** = W x 0.426

1.85:1
W = H x 1.85 ***H*** = W x 0.54

16:9 = 1.78:1 (native aspect ratio)
W = H x 1.78 ***H*** = W x 0.56

1.66:1 (Vista)
W = H x 1.66 ***H*** = W x 0.6

16:10 = 1.6:1
W = H x 1.6 ***H*** = W x 0.625

4:3 = 1.33:1
W = H x 1.33 ***H*** = W x 0.75

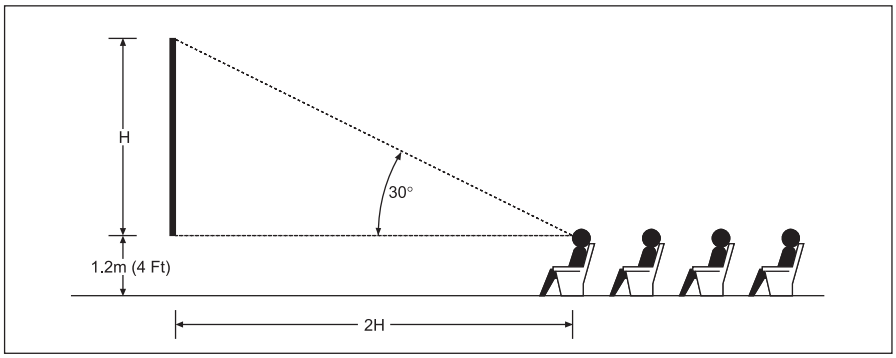
Notes

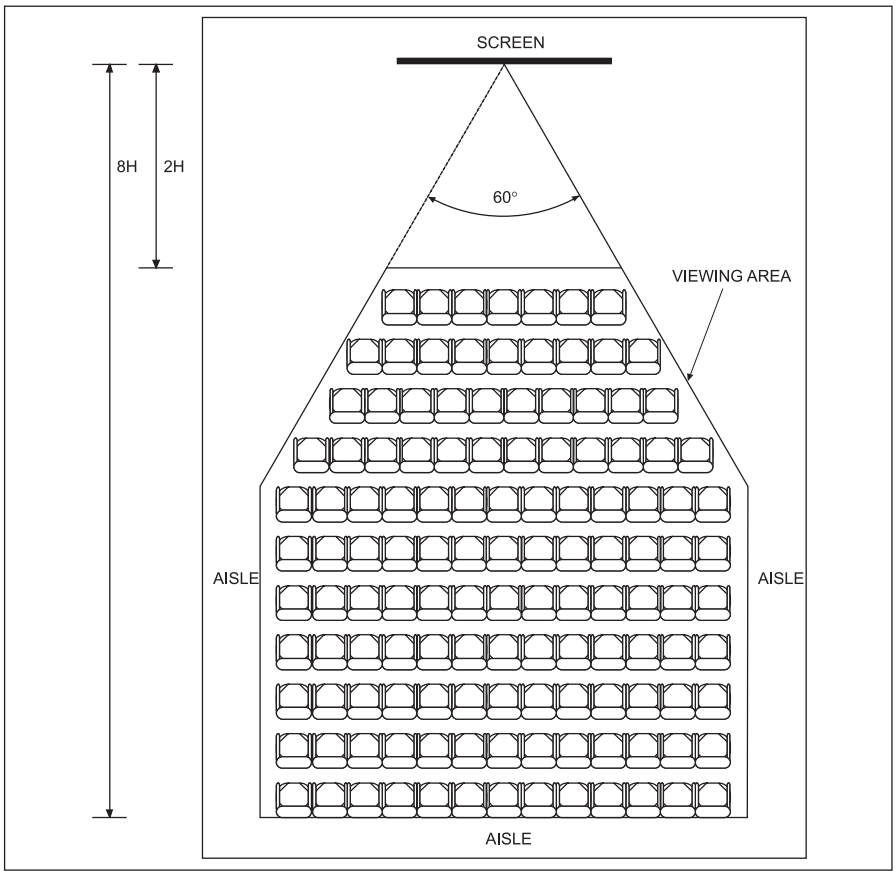
Positioning the screen and projector

Optimum viewing position

For optimum viewing, the screen should be a flat surface perpendicular to the floor. The bottom of the screen should be 1.2m (4 feet) above the floor and the front row of the audience should not have to look up more than 30° to see the top of the screen.

The distance between the front row of the audience and the screen should be at least twice the screen height and the distance between the back row and the screen should be a maximum of 8 times the screen height. The screen viewing area should be within a 60° range from the face of the screen.





Notes

The projector should be installed as close to the power outlet as possible.

The power connection should be easily accessible, so that it can be disconnected in an emergency.

Ensure that there is at least 30cm (12in) of space between the ventilation outlets and any wall, and 10cm (4in) on all other sides.

Do not install the projector close to anything that might be affected by its operational heat, for instance, polystyrene ceiling tiles, curtains etc.

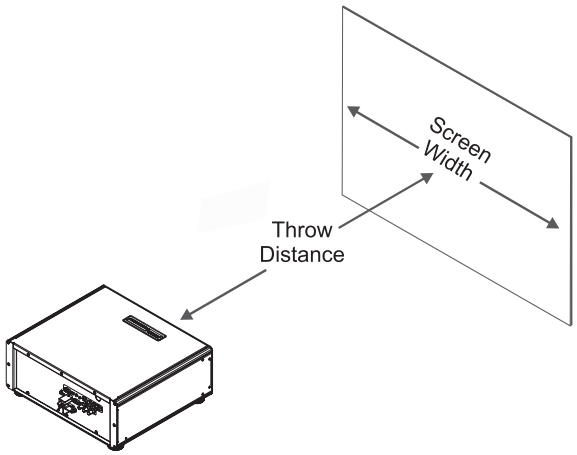
The image can be flipped for rear projection (see ***section 4. Using the menus****,* ***Image menu****) and displayed without the need for extra mirrors or equipment.*

However, you must ensure that there is sufficient distance behind the screen for the projector to be correctly located.

Rear installation is generally more complicated and advice should be sought from your local dealer before attempting it.

Screen size vs throw distance

Throw distance is the distance measured from the front of the projector to the screen. This is an important calculation in any projector installation as it determines whether or not you have enough room to install your projector with the desired screen size, and if your image will be the right size for your screen.



Calculating screen width and throw distance

Throw Distance = Screen Width x Lens Throw Ratio

Screen Width = $\frac{\text{Throw Distance}}{\text{Lens Throw Ratio}}$

The following lens calculations may be useful:

Throw ratio = $\frac{\text{Throw distance}}{\text{Screen width}}$

Throw ratio factor (TRF) = $\frac{\text{DMD width in pixels}}{\text{image width in pixels}} = \frac{1920}{\text{image width in pixels}}$

Therefore:

Screen width = $\frac{\text{Throw distance}}{\text{Throw ratio x TRF}}$

Throw distance = Screen width x Throw ratio x TRF

Notes

For more information about the relationship between screen size, throw distance and lenses, see **Choosing a lens** *on the following pages.*

The Throw ratio for a particular lens is fixed, but assumes that the image fills the width of the DMD.

For images that do not fill the width of the DMD, the Throw ratio is effectively increased. To correct for this in these calculations, a Throw Ratio Factor (TRF) is used.

Choosing a lens

A number of lenses are available for use with the projector. Which lens you choose will depend on the screen size, image aspect ratio, projection distance and light output.

The lenses available and their part numbers are listed below:

	High Brightness	High Contrast
0.77 : 1 fixed lens	110-808	110-022
1.16 : 1 fixed lens	110-809	110-023
1.45 - 1.74 : 1 zoom lens	110-803	110-017
1.74 - 2.17: 1 zoom lens	110-804	110-018
2.17 - 2.9: 1 zoom lens	110-805	110-019
2.9 - 4.34: 1 zoom lens	110-806	110-020
4.34 - 6.76: 1 zoom lens	110-807	110-021

If the image does not fill the full width of the DMD, this effectively increases the throw ratio of the lens. This can be corrected for by applying a Throw ratio factor.

Method one: using the lens charts

For the screen sizes listed below, use the charts on the following pages, to choose the most suitable lens.

Full width images, including:

2.35:1 (Scope) 1920 x 817 pixels

16:9 = 1.78:1 1920 x 1080 pixels (native resolution)

4:3 images

A Throw ratio factor (TRF) has been applied to the following chart:

4:3 = 1.33:1 1440 x 1080 pixels TRF = 1.33

Method two: by calculation

See the calculations, on the page immediately following the lens charts.

Notes

The High Brightness lenses are recommended for the High Brightness model, for maximum light output.

The High Contrast lenses are recommended for the High Contrast models, for maximum contrast.

ONLY the High Brightness lenses are recommended for the 1080p 330.

For more information about Throw ratio factor (TRF), see the previous page.

Choosing a lens using the lens charts

Use the charts on this page and on the following pages to choose which lens best suits your application.

Notes

This chart has a TRF of 1.0, for use with the following images:

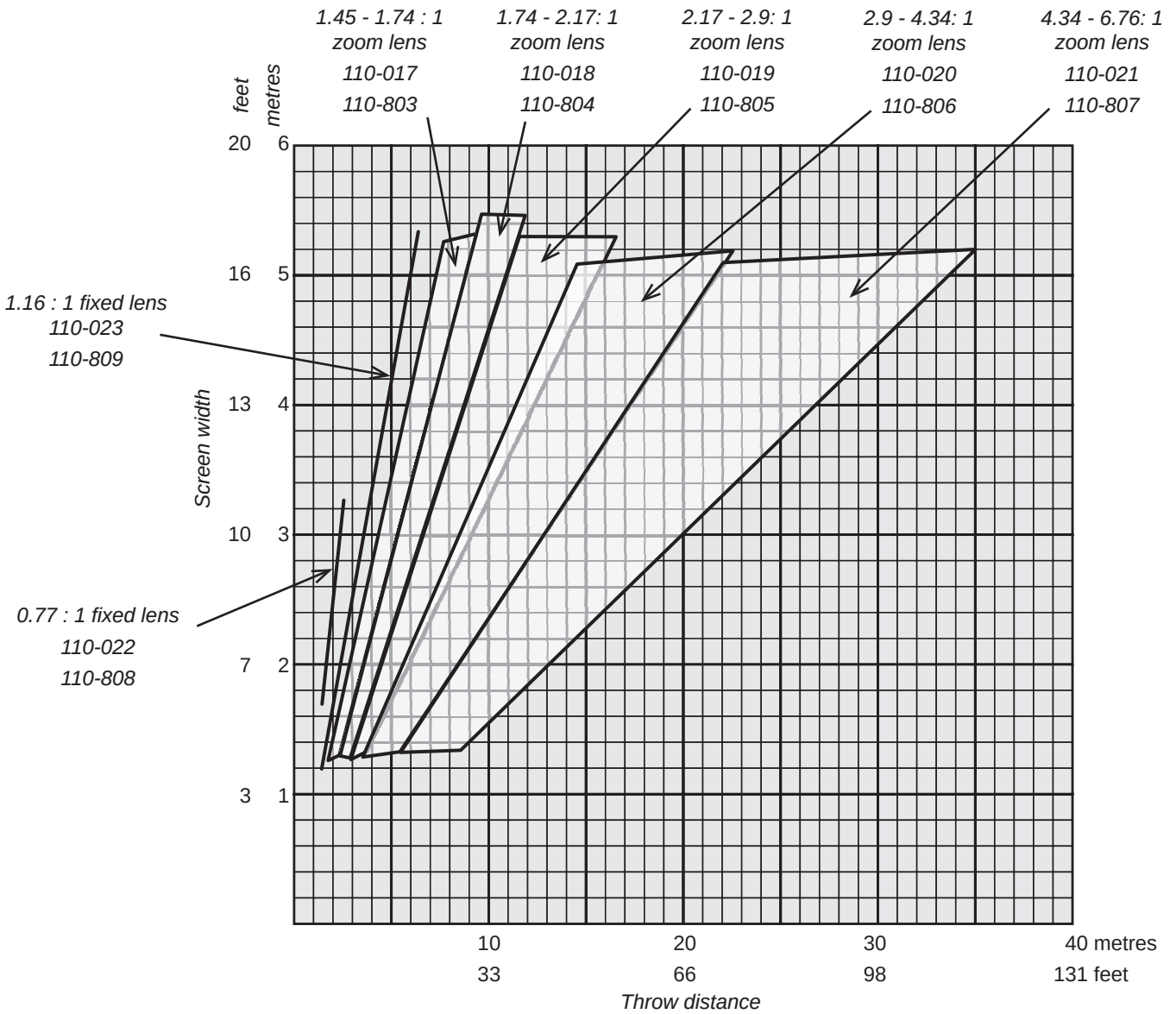
16:9
and 2.35:1

Full width images, including 2.35:1, and 16:9 (native resolution)

example

- For a screen width of 4m at a distance of 15m, the 2.9- 4.34: 1 zoom lens would be best suited.
- For the same screen size at a distance of 20m, the 4.34 - 6.76: 1 zoom lens would be best suited.

if you need to be more precise, then use the calculations on the page immediately following the lens charts.



Lens charts continued

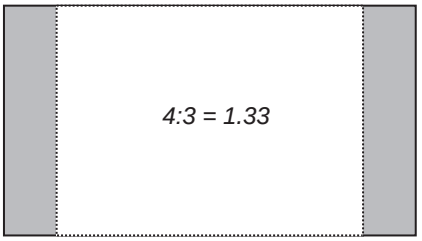
Full height image 4:3

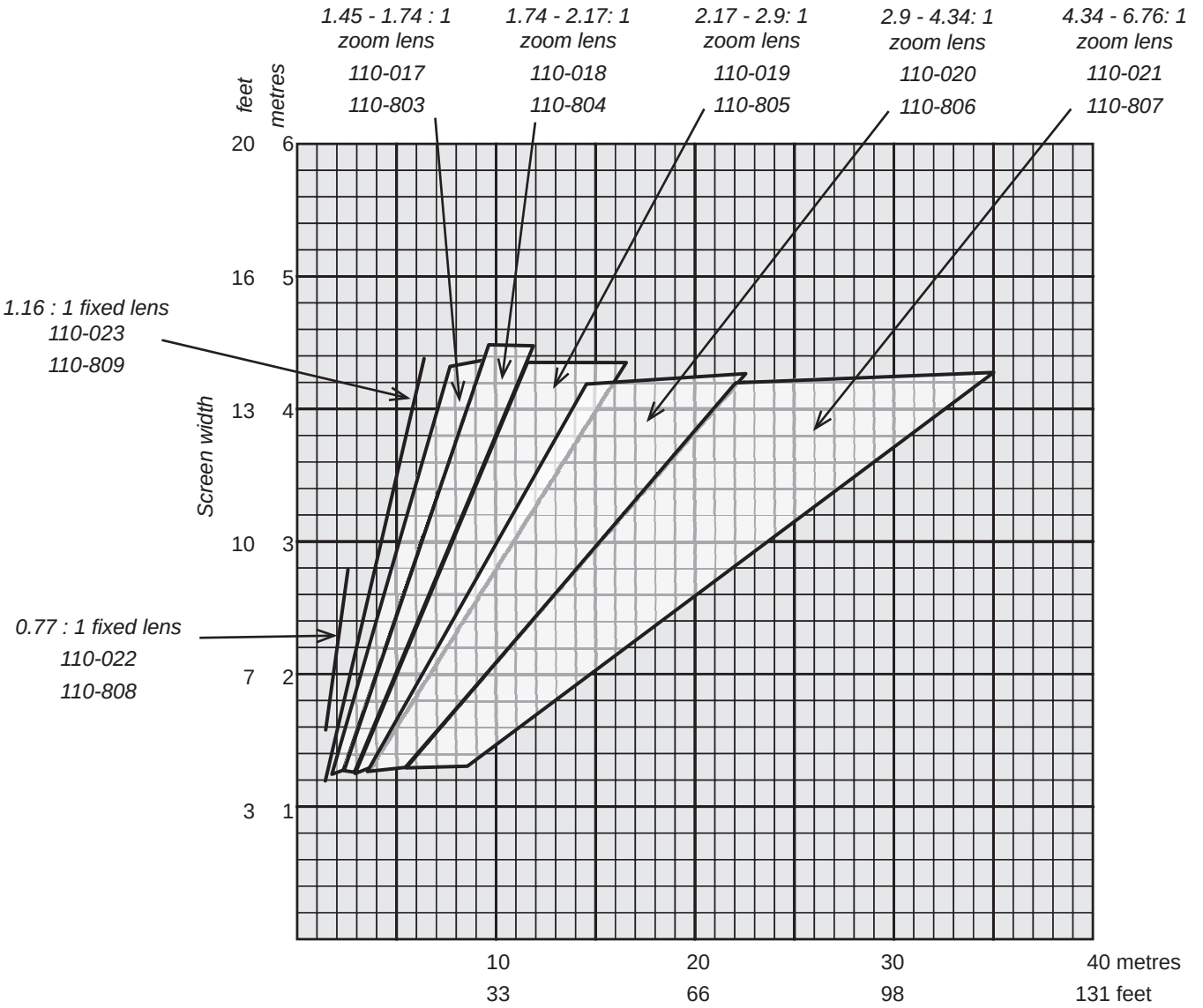
Use the chart below to choose which lens best suits your application.

if you need to be more precise, then use the calculations on the page immediately following the lens charts.

Notes

This chart has a TRF of 1.33, for use with the following images:





Choosing a lens by calculation

For any screen size not listed above, or if you need to be more precise, then use the calculations below.

- Identify actual width of the image in pixels.
- Calculate the Throw Ratio Factor: TRF = $\frac{\text{DMD width (1920)}}{\text{Image width in pixels}}$
- Identify the screen width required.
- Identify the throw distance required.

  Throw distance calculations are based on the distance from the outer end of the lens, which will vary from lens to lens. Once a lens has been chosen, the figures can be checked using the lens extension values given below.
- Calculate the throw ratio required. Throw ratio = $\frac{\text{Throw distance}}{\text{Screen width x TRF}}$
- Choose a lens with the required throw ratio from the list at the bottom of the page.

  Check from the list that the lens chosen will work at the throw distance required.

Example

- An image, 1024 x 768 pixels, screen width 3.0m, throw distance 17m from the outer end of the lens.
- Throw Ratio Factor (TRF) = $\frac{1920}{1024}$ = 1.875
- Throw ratio required = $\frac{17}{3.0 \times 1.875}$ = 3.02
- Choose the 2.9 - 4.34 : 1 zoom lens.

Notes

The Throw ratio for a particular lens is fixed, but assumes that the image fills the width of the DMD.

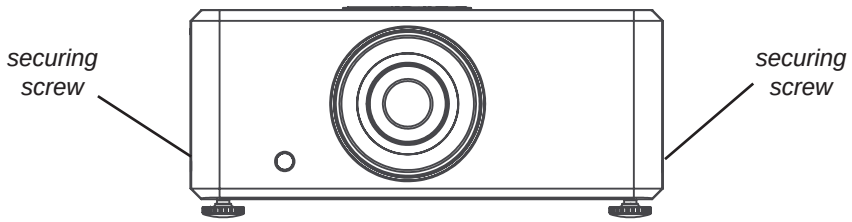
For images that do not fill the width of the DMD, the Throw ratio is effectively increased. To correct for this in these calculations, a Throw Ratio Factor (TRF) is used.

ONLY the High Brightness lenses are recommended for the 1080p 330.

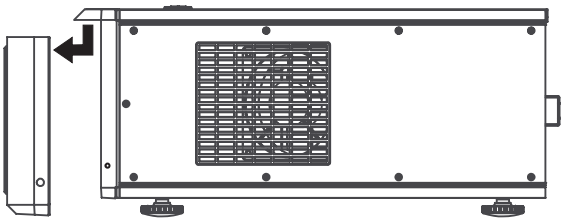
	High Brightness	High Contrast	Extension	Throw distance range
0.77 : 1 fixed lens	110-808	110-022	80 mm (3.2 in)	1.3 - 2.5m (4.3 - 8.2ft)
1.16 : 1 fixed lens	110-809	110-023	54 mm (2.1 in)	1.4 - 6.2m (4.6 - 20.3ft)
1.45 - 1.74 : 1 zoom lens	110-803	110-017	24 mm (1.0 in)	Wide: 1.8 - 7.6m (5.9 - 24.9ft) Tele: 2.2 - 9.3m (7.2 - 30.5ft)
1.74 - 2.17: 1 zoom lens	110-804	110-018	n/a	Wide: 2.2 - 9.5m (7.2 - 31.2ft) Tele: 2.7 - 11.8m (8.9 - 38.7ft)
2.17 - 2.9: 1 zoom lens	110-805	110-019	n/a	Wide: 2.7 - 11.5m (8.9 - 37.7ft) Tele: 3.7 - 15.4m (12.1 - 50.5ft)
2.9 - 4.34: 1 zoom lens	110-806	110-020	n/a	Wide: 3.6 - 14.7m (11.8 - 48.2ft) Tele: 5.5 - 22.5m (18 - 73.8ft)
4.34 - 6.76: 1 zoom lens	110-807	110-021	n/a	Wide: 5.5 - 22m (18 - 72.2ft) Tele: 8.6 - 35m (28.2 - 114.8ft)

Fitting the lens

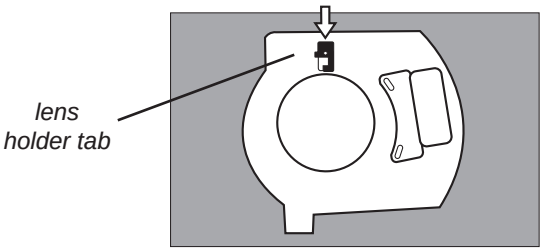
- Remove the two screws securing the front cover to the body of the projector.



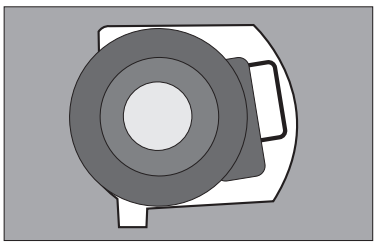
- Push the front cover downwards, then pull it away from the projector.



- Push down the lens holder tab.



- Hold down the tab, and insert the lens into the lens aperture, making sure that the plug on the zoom drive mechanism lines up with the socket on the right of the lens aperture.

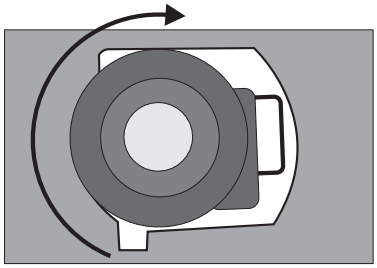


Notes

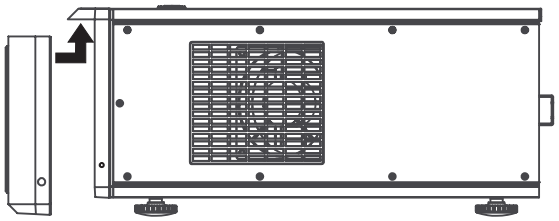
Make sure the rear lens cap is removed, before fitting the lens.

Be careful not to scratch the lens surfaces. If you do accidentally touch a lens, then clean the surface using a lens paper.

- Still holding down the tab, push the lens in firmly as far as it will go.
- Rotate the lens clockwise as far as it will go.



- Release the lens holder tab.
- Position the front cover as shown below, hold it against the front of the projector, then push it upwards into place.



- Replace the two screws.

Notes

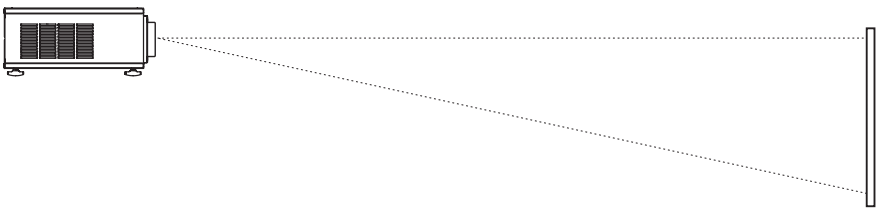
Make sure the rear lens cap is removed, before fitting the lens.

Be careful not to scratch the lens surfaces. If you do accidentally touch a lens, then clean the surface using a lens paper.

Shifting the image

Ideally, the projector should be positioned perpendicular to the screen.

The normal position for the projector is at the centre of the screen. However, with the zoom lenses, you can set the projector above or below the centre, or to one side, and adjust the image using the **Lens shift** controls on the top of the projector to maintain a geometrically correct image.



The maximum range available with no distortion is dependent on which zoom lens is used. The tables below show the maximum range for images that fill the DMD. For images which do not use the full height or width, extra shift may be possible, up to the limit of the lens mount movement.

fixed lenses

vertical (pixels)	*horizontal (pixels)*	*vertical (vs DMD height)*	*horizontal (vs DMD width)*
+ 216	± 96	+ 0.2H (40%)	± 0.05W (10%)

zoom lenses

vertical (pixels)	*horizontal (pixels)*	*vertical (vs DMD height)*	*horizontal (vs DMD width)*
± 648	± 288	± 0.6H (120%)	± 0.15W (30%)

It is physically possible to shift the lens further than this, however there will be some distortion of the image beyond the ranges specified above.

Notes

*For more information on using the Lens shift feature, see **section 4. Using the menus, Using the control keys**.*

If the lens is to be shifted in two directions combined, the maximum range is somewhat less, as can be seen below. (zoom lens shift shown).

full horizontal or vertical shift without distortion

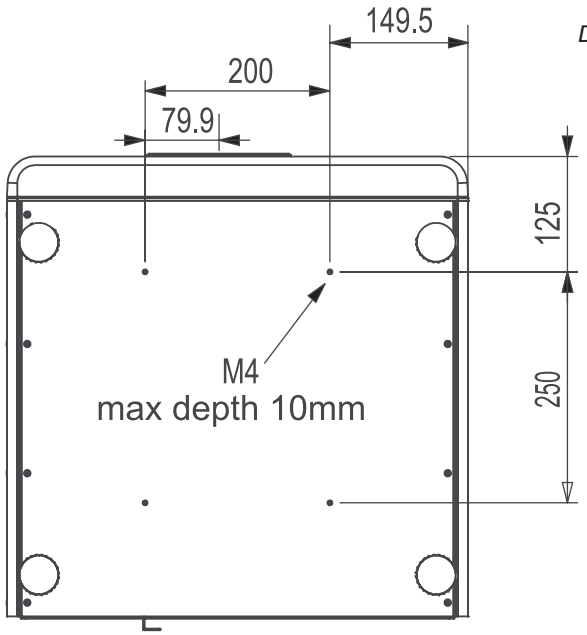
combined shift is reduced

Mounting the projector

The four adjustable feet under the chassis allow the projector to be lowered onto a flat surface without any danger of hands being trapped between the bottom frame and the surface.

Ceiling mounting

The projector is designed to be used on a flat surface, but it can be suspended from a ceiling. Four M4 mounting holes with a 0.7mm pitch are provided under the projector to allow bolting to a ceiling mounting plate.



Dimensions in mm

To use the projector upside down, set **Ceiling mode** to **On**, in the **System** menu, to invert the image.

Level adjustment

If the projector is to be operated from a flat surface such as a projector table, then adjustment of projector level should be made by turning the four feet under the chassis.

Ideally, the projector should be positioned perpendicular to the screen, and the lens shift controls used to align the image with the screen, to maintain a geometrically correct image.

Notes

BEFORE INSTALLING THE PROJECTOR, READ ALL THE WARNINGS BELOW AND ALL THOSE IN *IMPORTANT INFORMATION* AT THE FRONT OF THIS MANUAL.

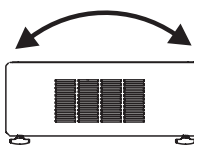
The projector weighs approximately 20 kg (44 lbs). Use safe handling techniques when lifting the projector.

Make sure that the surface, ceiling or rigging that is to support the projector is capable of supporting the weight of the projector.

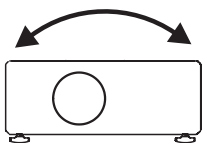
Backup safety chains or wires should always be used with ceiling mount installations.

Do not tilt the projector more than ±8.5° forwards and backwards when in use, as this may cause serious lamp failure, damage the lamp module and cause extra cost on replacement. The projector my be tilted left and right as necessary.

±8.5°



±8.5°



Rear projection

To use rear projection, set **Rear Projection** to **On**, in the **System** menu, to reverse the image.

In rear-screen applications where space behind the projector is limited, a mirror may be used to fold the optical path. The position of the projector and mirror must be accurately set. If you are considering this type of installation, contact your dealer for assistance

Stacking projectors

The projector is capable of supporting the weight of up to three other projectors safely. The stack should be positioned vertically and perpendicular to the screen, and the lens shift controls used to align the image with the screen, to maintain a geometrically correct image.

- Carefully lower each projector down onto the top of the others, making sure that they are vertically aligned with each other, and protected from becoming pushed over.
- Align the images from the projectors, using the **Lens shift** controls on the top of the projector.

Notes

For more detailed information about using the menus, see **section 4. Controlling the projector**.

Do not try to stack more than three projectors.

When stacking projectors, the stack MUST be vertical, to ensure that the stresses are distributed to all four chassis corners.

Make sure that the surface, ceiling or rigging that is to support the projector is capable of supporting the combined weight of all the projectors.

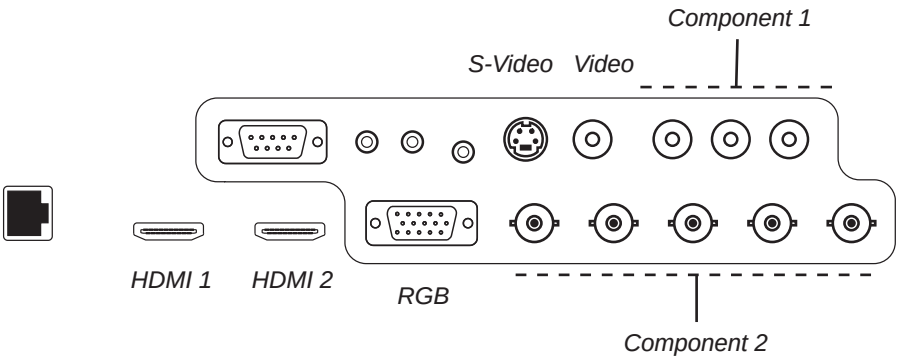
Do not place heavy objects on top of the projector chassis. Only the chassis corners are capable of withstanding the weight of another projector.

Backup safety chains or wires should always be used with ceiling mount installations.

Connecting the projector

Signal Inputs

The following inputs are available:



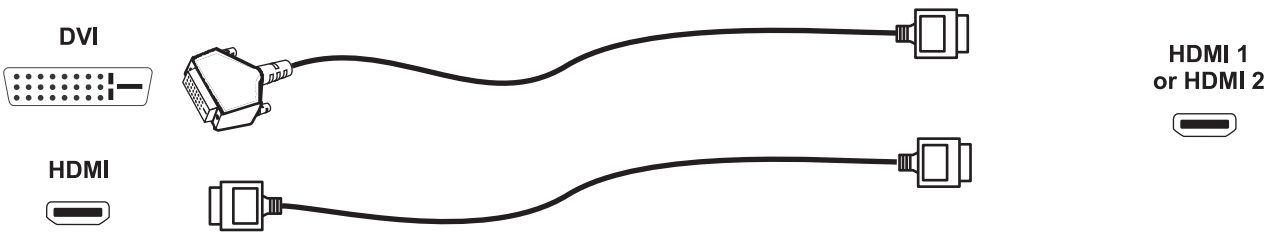
HDMI 1 & 2	HDCP-compliant digital video inputs from HDMI or DVI sources.
RGB	15 pin D-type VGA style input from personal computer
Component 1	RCA phono connectors for RGBS, (using Video input for sync) or YPbPr
Component 2	BNC connectors for RGB or RGBHV
Video	RCA phono connector for composite video or used as sync input for Component 1
S-Video	standard 4 pin S-Video connector

Notes

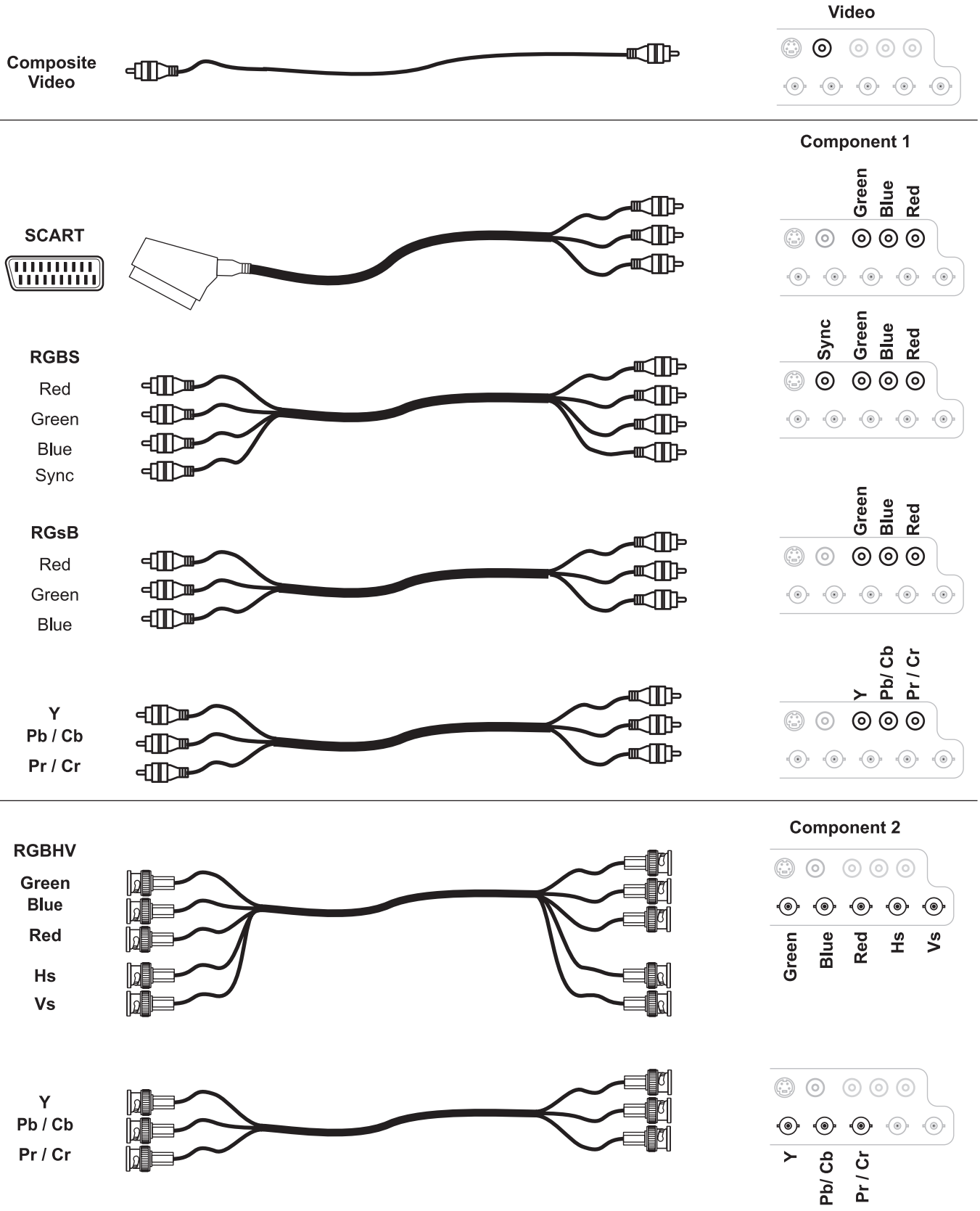
For more information on selecting an input source, see **section 4. Overview, Using the control keys***, and* **Using the menus***.*

For more information about pin connections and control codes see **section 6. Appendix.**

Input connection examples

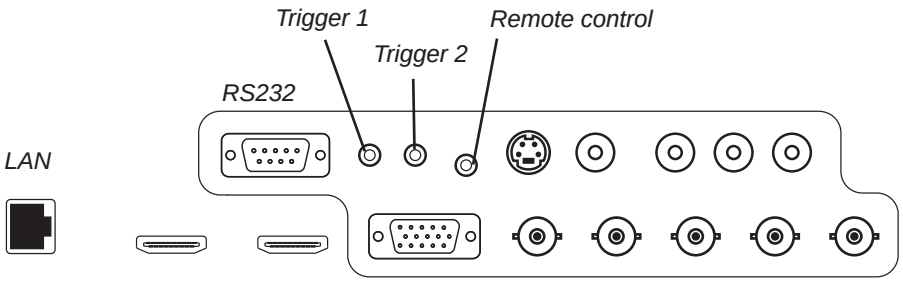


Input connection examples, continued



Control connections

The following connections are available:



Remote control

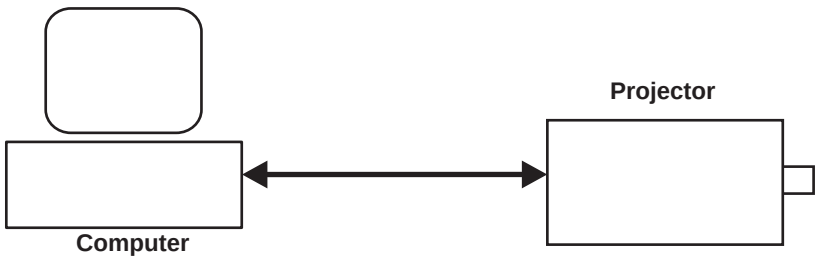
If infrared signals from the remote control cannot reach the projector due to excessive distance or obstructions such as walls or cabinet doors, you can connect an external IR repeater to the Remote control input, and position its IR sensor within range of the operator.

RS232 and LAN connections

All of the projector's features can be controlled using an external control system, or a PC using a terminal-emulation program such as HyperTerminal, via a serial or LAN connection. This is done by using the text strings described in **Remote communications protocol**, in **section 6. Appendix**.

The RS232 or LAN connection can also be used to download the firmware updates, issued from time to time by Digital Projection.

Trigger 1 & 2



The Trigger 1 and Trigger 2 outputs are interchangeable:

Screen trigger: can be connected to an electrically operated screen, automatically deploying the screen when the projector starts up, and retracting the screen when the projector shuts down.

Aspect Ratio trigger: can be used to control screen shuttering for different aspect ratios

Notes

For more information about pin connections and control codes see **section 6. Appendix.**

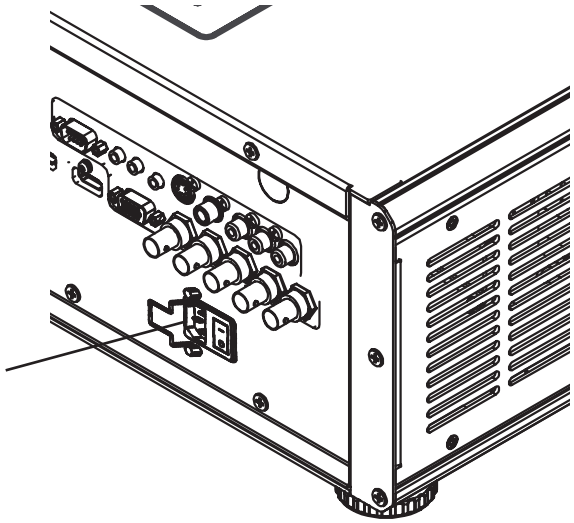
For information how to enable and disable the remote control, see **Control Menu** *in* **section 4. Controlling the projector**, *and* **Remote communications protocol**, *in* **section 6. Appendix**.

For more information how to switch between RS232 and LAN control see **Control Menu** *in* **section 4. Controlling the projector**, *and* **Remote communications protocol**, *in* **section 6. Appendix.**

For more information about the Trigger outputs see **Control Menu** *in* **section 4. Controlling the projector.**

Power connection

- Push the cable lock to the left, plug the mains connector in firmly, then push the lock back to secure the cable.
- Switch on at the switch next to the power connector.



Notes

Use only the power cable provided.

Ensure that the power outlet includes a Ground connection, as this equipment MUST be earthed.

Handle the power cable carefully and avoid sharp bends. Do not use a damaged power cable.

3. Getting Started
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Selecting an input signal or test pattern *3.3*
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Test pattern *3.3*
Adjusting the projected image *3.4*
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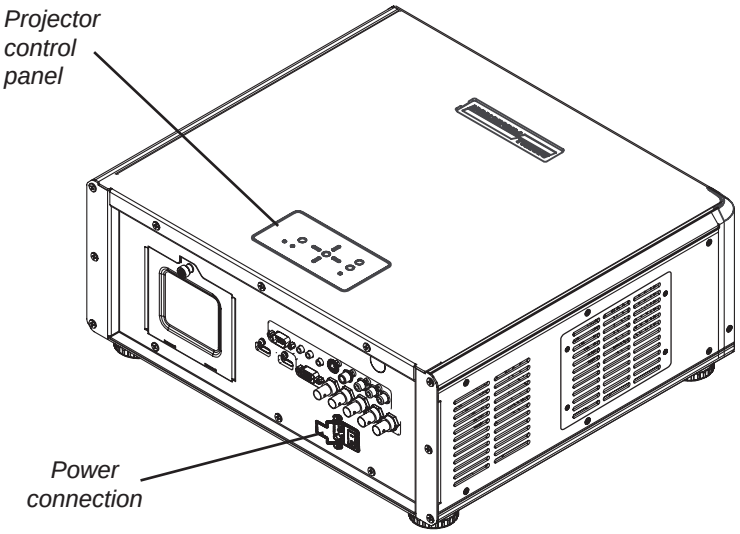
Positioning the screen and projector

- Install the screen, ensuring that it is in the best position for viewing by your audience.
- Mount the projector, ensuring that it is at a suitable distance from the screen for the image to fill the screen, and that it is perpendicular to the sceen.

Switching the projector on

- Connect the power cable between the mains supply and the projector. Switch on at the switch next to the power connector.

  Wait until the self-test has completed and the standby indicator on the projector control panel shows amber. The lamp will be off and the projector will be in STANDBY mode.



- Press POWER ON [I] on the remote control or POWER ⏻ on the projector control panel to switch the projector ON. The power indicator on the control panel will flash blue for approximately 30 seconds, whilst the lamp comes up to full brightness. When the projector is ready for use, the power indicator will show a steady blue.

Inserting batteries into the remote control

- Open the battery compartment and insert two AA size batteries, making sure they are inserted the correct way round, as shown below.

Notes

For more information about positioning the screen and projector, see **Positioning the screen and projector**, *in* **section 2. of the User Manual: Installation**.

For more detailed information about:

- using the control keys on the remote control or the projector control panel,

- using the menus,

see **section 4. of the User Manual: Controlling the projector**.

If the red **ISSUE** *indicator is illuminated continuously or flashing, see* **Error Codes** *in* **section 6 of the User Manual: Appendix**, *for more information*

Do not mix an old battery with a new one or different types of batteries.

If you will not use the remote control for a long time, remove the batteries to avoid damage from battery leakage.

Selecting an input signal or test pattern

Input

- Connect an video source to the projector. The signal should be automatically detected by the projector, and should be displayed within a two or three seconds.
- If more than one signal is connected to the projector, then select which signal is to be displayed, using the [1] to [5] buttons on the remote control, or by pressing the SOURCE button on the projector control panel until the correct signal is displayed.

Test pattern

If you have no video source connected to the projector, then you can display a test pattern as follows:

- Press [TEST] on the remote control, until the desired test pattern is displayed.

Notes

For more information about connecting input signals, see **Signal Inputs***, in* **section 2. of the User Manual: Installation***.*

For more detailed information about input connections, see **Input signals** *in* **section 6. of the User Manual: Controlling the projector***.*

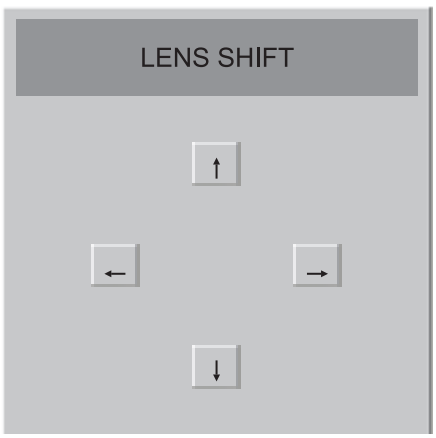
Adjusting the lens

- Press the [LENS] key repeatedly to cycle through the **Lens adjustments**, in the following order:

  Focus, Zoom, Shift...

- Use the use the ▲, ▼, ◀ and ▶ keys to adjust the lens.

Example - Lens Shift control:



For more information about lens shift, see **Shifting the image** *in* **section 2. of the User Manual: Installation***.*

Adjusting the projected image

Aspect ratio

- Press ASPECT RATIO on the remote control until the image is displayed in the corect aspect ratio.

Image quality settings

- Press any of the following keys on the remote control, followed by ◀ and ▶, to adjust these image quality settings:

Brightness	☼
Contrast	◐
Sharpness	SHARP

Switching the projector off

- Press POWER OFF ⏻ on the remote control or POWER ⏻ on the projector control panel, then press the button a second time to confirm your intention to switch off.

  The lamp will switch off, and the power indicator on the control panel will flash blue for approximately 30 seconds until the lamp has cooled down.

- Wait until the power indicator has switched off and the standby indicator on the projector control panel shows amber. The projector will now be in STANDBY mode.

- Switch off the power switch next to the power connection, then disconnect the power cable from the projector.

Notes

For more detailed information about:

- using all the control keys on the remote control or the projector control panel,

- using the menus,

see **section 4. of the User Manual: Controlling the projector**.

For the picture setting adjustments shown here:

- after 5 seconds, if no adjustment has been made, the indicator will go out and the adjustment key must be pressed again.

- to end the adjustment before 5 seconds has elapsed, press a different adjustment key, or press the key again.

Always allow the lamp to cool for 5 minutes before:

- disconnecting the power
- moving the projector
- changing the lamp
- cleaning the fans and filter

4. Controlling the projector
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Overview

Controlling the projector

The projector can be controlled from:

- the remote control
- the projector control panel
- the RS232 input

  For more information about controlling the projector using the RS232 input, see **Remote communications protocol** in **section 6. Appendix.**

  For information about how to connect the projector, see **Connecting the projector** in **section 2. Installation**, and **Connections in section 6. Appendix**.

- Many features are controlled from the menus using the menu navigation keys on the remote control or the projector control panel.

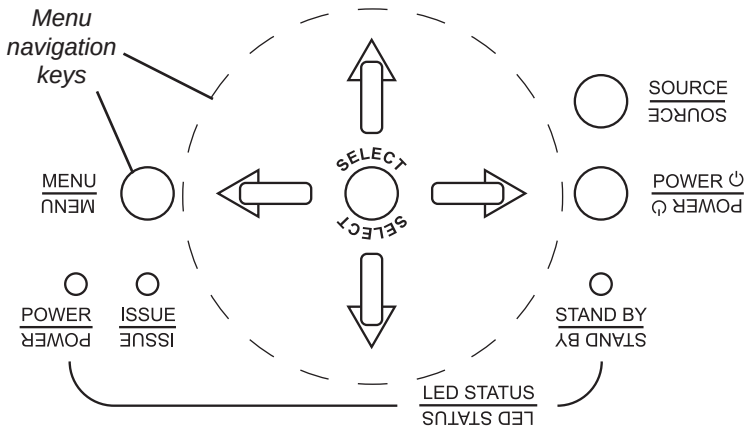
  For more information about using the menus, see later in this section, **Using the menus**.

- Some of the menu features, for example brightness, contrast and sharpness, can be accessed directly using the control keys at the bottom of the remote control.

Notes

The control panel

The projector control panel is designed to be read from the front or rear of the projector, for ease of use.



The menu navigation keys are similar to those on the remote control, and are described in detail in **Using the menus**, later in this section.

POWER Press this once to switch the projector ON or twice to switch it to STANDBY mode.

SOURCE Press this repeatedly to cycle through the input sources, in the following order:

HDMI 1, HDMI 2, RGB, Composite 1, Composite 2, Video, S-Video, HDMI 1...

If you select a source that IS connected and active, the projector will automatically adjust to the parameters of the signal, and display it.

If you select a source that is NOT connected or active, the projector will continue searching through the input sources until it finds a valid signal.

LED status indicators

The indicators on the control panel are as follows:

POWER *off* = NO POWER *steady blue* = normal RUNNING mode

flashing blue = LAMP WARM-UP or COOL-DOWN mode

ISSUE *off* = NO ERROR *flashing or steady red* = ERROR

STANDBY *amber* = STANDBY mode

Notes

Many features are controlled from the menus using the **menu navigation keys** *on the remote control or the projector control panel.*

For more information about using the menus, see later in this section, **Using the menus**.

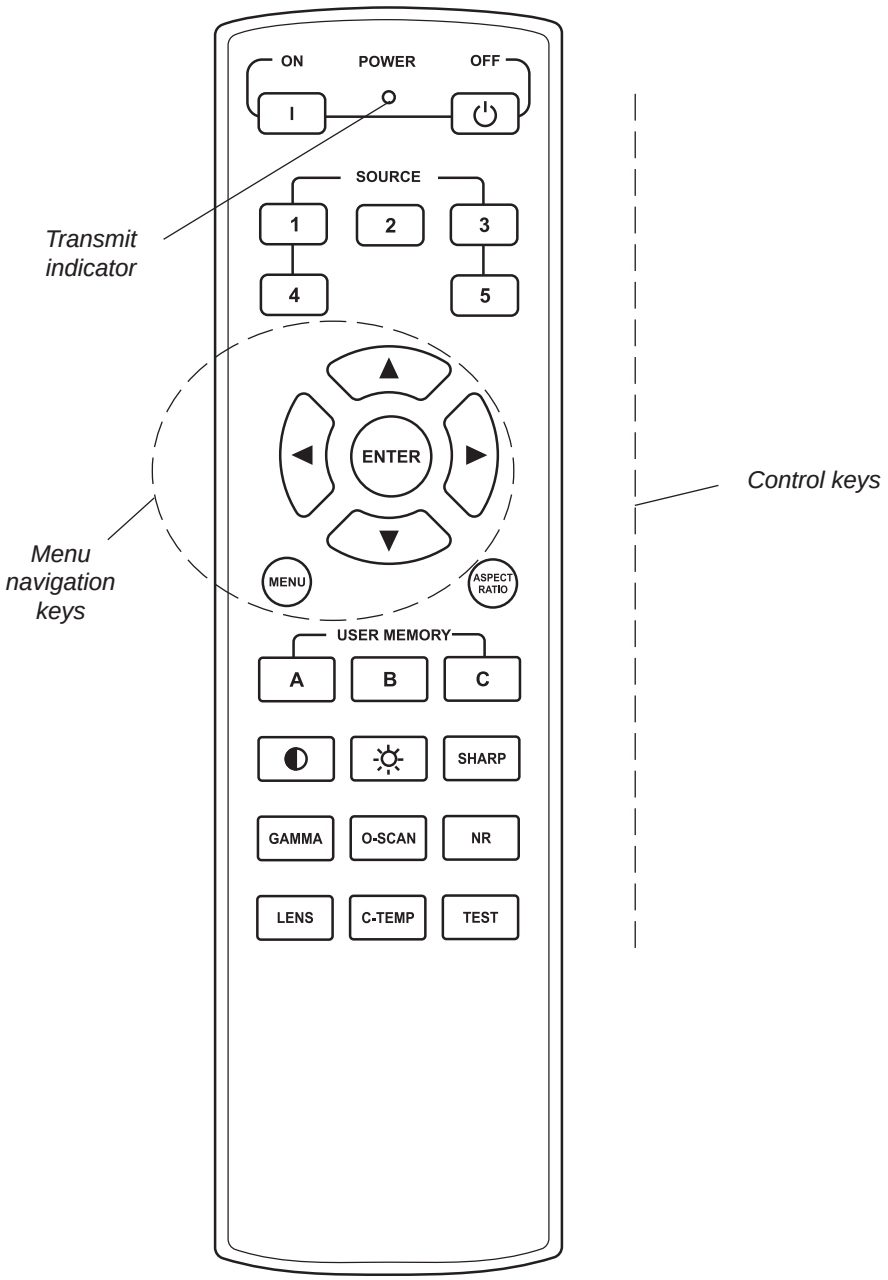
Always allow the lamp to cool for 5 minutes before:

- moving the projector
- changing the lamp

If the red **ISSUE** *indicator is illuminated continuously or flashing, see* **Error Codes** *in* **section 6. Appendix**, *for more information*

The remote control

Layout



Timeout

There is a 5 second timeout for the **control** keys at the bottom of the remote control:

- after 5 seconds, if no adjustment has been made, the indicator will go out and the adjustment key must be pressed again.

- to end the adjustment before 5 seconds has elapsed, press a different adjustment key, or press the key again.

There is a 30 second timeout for the **menu navigation** keys.

Notes

Many features are controlled from the menus using the **menu navigation keys** *on the remote control or the projector control panel.*

For more information about using the menus, see later in this section, **Using the menus**.

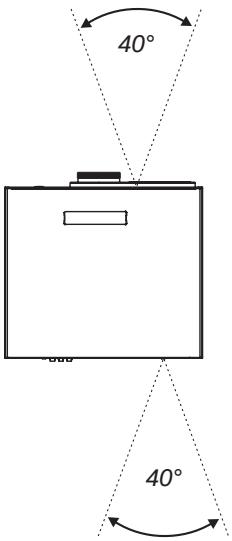
Some of the menu features, for example brightness, contrast and sharpness, can be accessed directly using the ***control keys*** *at the bottom of the remote control.*

For more information about using the control keys, see later in this section, **Using the control keys**.

In most situations, you can simply point the remote control at the screen which will reflect the IR signal from the remote back toward the receiver on the projector.

In some cases, however, ambient conditions may prevent this. In this case, point the remote control directly at the projector.

Remote reception angle



Using the control keys

Power

- Press POWER ON [I] on the remote control to switch the projector ON.

  The power indicator on the control panel will flash blue for approximately 30 seconds, whilst the lamp comes up to full brightness. When the projector is ready for use, the power indicator will show a steady blue.

- Press POWER OFF [⏻] on the remote control to switch the projector to STANDBY mode.

  Press the button a second time to confirm your intention to switch to STANDBY mode.

  The lamp will switch off, and the power indicator on the control panel will flash blue for approximately 30 seconds until the lamp has cooled down. Wait until the power indicator has switched off and the standby indicator on the projector control panel shows amber. The projector will now be in STANDBY mode.

Source

- To switch to one of the five sources programmed into the SOURCE buttons, then select using the [1] to [5] keys.

  If you select a source that IS connected and active, the projector will automatically adjust to the parameters of the signal, and display it.

  If you select a source that is NOT connected or active, the projector will continue searching through the input sources until it finds a valid signal, in this order.

  HDMI 1, HDMI 2, RGB, Composite 1, Composite 2, Video, S-Video, HDMI 1...

Aspect ratio

- Press (ASPECT RATIO) repeatedly to cycle through the **Aspect ratio** settings, in the following order:

  16:9, Theaterscope, 4:3, 4:3 Narrow, Native, 16:9...

User memory

- To switch to one of the three sets of image settings programmed into the USER MEMORY buttons, then select using the [A] [B] or [C] keys.

Notes

For more information about the sources programmed into the SOURCE keys, see **Control menu** *later in this section,* **Using the menus**.

For more information about the **Aspect ratio** *settings, see* **Screen requirements** *in* **section 2. Installation**.

For more information about the settings programmed into the USER MEMORY keys, see **Control menu** *later in this section*.

Note: **User memory D** *is available only through the* **Control menu**.

Image quality settings

- Press any of the following keys on the remote control, followed by ◀ and ▶, to adjust these image quality settings:

Brightness	☼
Contrast	◐
Sharpness	SHARP
Gamma	GAMMA
Overscan	O-SCAN
Noise reduction	NR
Colour temperature	C-TEMP

Example - Brightness screen control:

Test pattern

- Press the TEST key repeatedly to cycle through the **Test patterns**, in the following order:

  White, Black, Red, Green, Blue, Cyan, Magenta, Yellow, Chequerboard, Greyscale, Alignment grid, White...

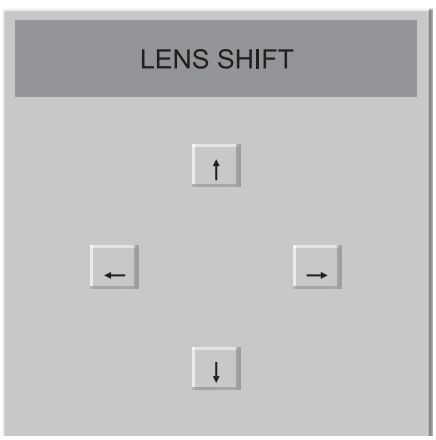
Lens

- Press the LENS key repeatedly to cycle through the **Lens adjustments**, in the following order:

  Focus, Zoom, Shift...

- Use the use the ▲, ▼, ◀ and ▶ keys to adjust the lens.

Example - Lens Shift control:



Notes

For more information about all these image quality settings, and more, see **Main menu** *and* **Advanced menu** *later in this section,* **Using the menus**.

Some of the settings will not be available for some of the input sources.

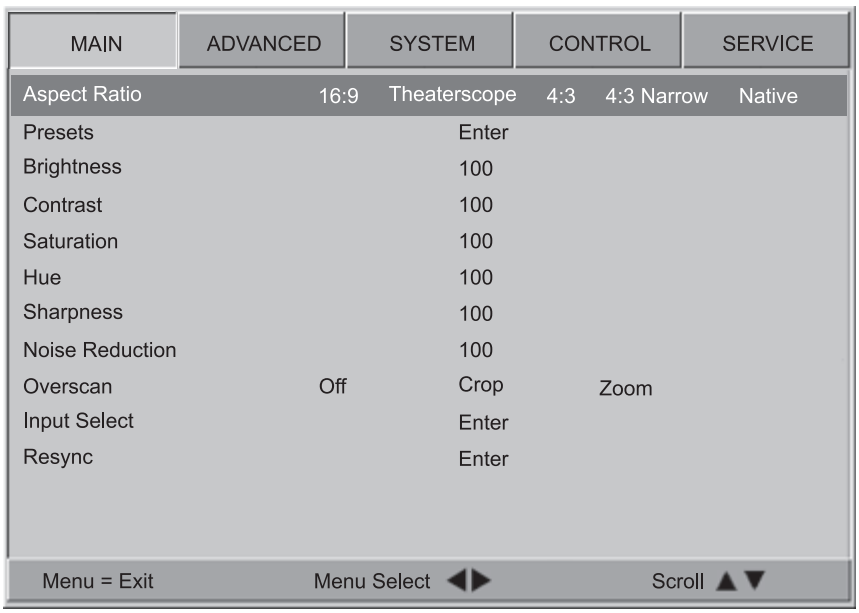
Using the menus

Navigating menus and submenus

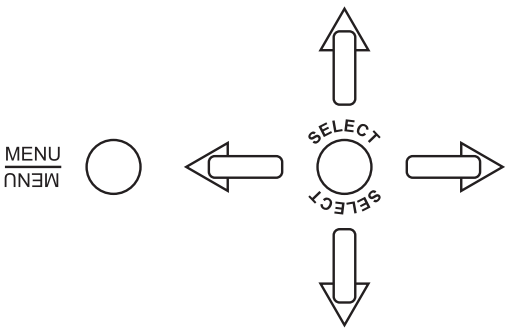
The menus are organised into five pages. When the menus are in use, the **menu page headings** are always visible at the top of the menu panel.

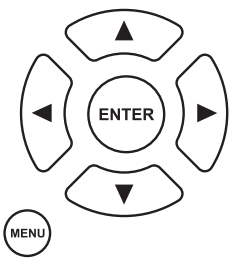
Most **menu** items can be adjusted directly, but some items lead to a **submenu**.

The menus will always open at the same page that was last viewed. The example below shows the first menu page displayed following power on, which is always the **Main menu**.



- Use the navigation keys on the remote control or the projector control panel to navigate through the menus:





- To display the menus, press MENU (MENU) on the remote control or the projector control panel.
- To select a different menu page, use the ◀ and ▶ keys.
- To select a menu item, use the ▲ and ▼ keys.
- To close a menu, press MENU (MENU) again.

Notes

Some menu controls can be accessed directly using the **control keys** *(see earlier in this section).*

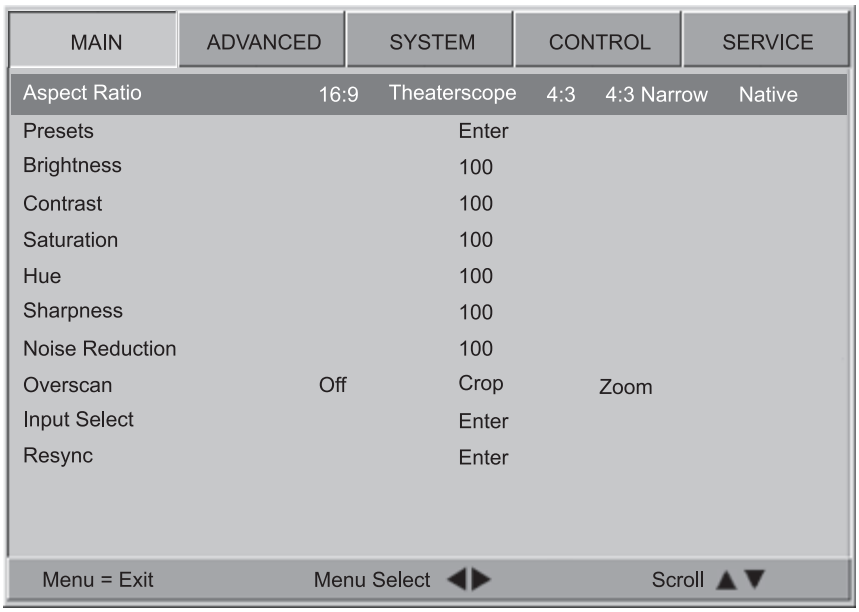
There is a 30 second timeout for the menu navigation keys. If a menu times out, simply press the **Menu** *key again.*

The SELECT key on the projector control panel has exactly the same funtion as the ENTER key on the remote control.

To exit from the menus completely, you may need to press (MENU) up to three times.

Main menu

- To display the menus, press MENU (MENU) on the remote control or the projector control panel.
- Use the ◀ and ▶ keys to select the **Main menu** page,



- To select a menu item, use the ▲ and ▼ keys until the item is highlighted.

Aspect Ratio

- Use the ◀ and ▶ keys to select from:

16:9 the image is scaled to fill the DMD (and thus, a 16:9 screen).

Theaterscope the image is scaled such that a 2.35:1 image will be displayed at the correct aspect ratio when the projector is fitted with an anamorphic lens. Thus an image with an aspect ratio of 2.35:1 can be displayed using the full 16:9 resolution of the DMD.

4:3 the image is scaled to fit a 4:3 screen, using the full height of the DMD.

4:3 Narrow to be used for 4:3 images in combination with an anamorphic lens. The image is scaled to fit the DMD vertically, but squeezed horizontally such that the lens will stretch it to the correct ratio.

Native the image is displayed with no scaling, at its original resolution, in the centre of the screen.

Notes

To select a different menu, press MENU (MENU) once or twice, so that no items are highlighted, then use the ◀ and ▶ keys to select a different page.

To exit from the menus completely, you may need to press (MENU) up to three times.

Image changes made using the menus will take effect immediately.

Some menu items may be greyed out - unavailable due to the effect of settings made in other menus, or due to the type of input signal.

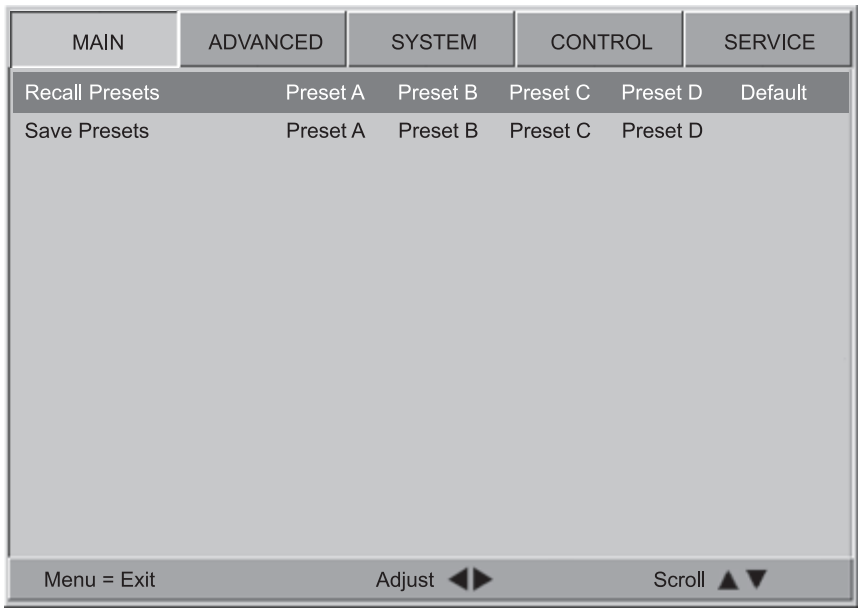
For more information about the **Aspect ratio** *settings, see* **Screen requirements** *in* **section 2. Installation**.

Main menu continued

Presets

- Press ENTER or SELECT.

  The **Presets** submenu will appear:



- Use the ▲ and ▼ keys to select from:

  Recall Presets

  Save Presets

Recall Presets

Recall a set of image settings that have previously been saved to Presets A, B, C or D.

- Use the ◀ or ▶ keys to select which Preset is to be recalled.
- Select **Default**, to recall the factory default settings.

Save Presets

Save the the image settings for all seven inputs to the selected **Preset**.

- Use the ◀ or ▶ keys to select which Preset the settings will be saved to.

  The following settings will be saved:

Brightness	**Contrast**	**Saturation**
Hue	**Sharpness**	**Noise Reduction**
Color Space	**Video Standard**	**Gamma**
Colour Temperature	**Color Gamut**	**Brilliant Color**
Adaptive Contrast	**RGB Offsets**	**RGB Gains**
Lamp Power		

- To return to the **Main menu**, press MENU once.

Notes

To select a different menu, press MENU once or twice, so that no items are highlighted, then use the ◀ and ▶ keys to select a different page.

To exit from the menus completely, you may need to press MENU up to three times.

Image changes made using the menus will take effect immediately.

The **Presets** *can also be recalled using the USER MEMORY keys on the remote control. See* **Using the control keys** *earlier in this section.*

Note: **Preset D** *is available only through the* **Control menu**, *not through the remote control.*

When **Save Presets** *is selected, the image settings for* **ALL** *seven inputs are saved.*

Main menu continued

Brightness

- Press ◀ or ▶ once.

After the first press, the **Brightness** adjustment bar will appear:

- Use the ◀ and ▶ keys to adjust the **Brightness** from 0 to 200:
- To return to the **Main menu**, press (MENU) once.

Contrast

- Press ◀ or ▶ once.

After the first press, the **Contrast** adjustment bar will appear.

- Use the ◀ and ▶ keys to adjust the **Contrast** from 0 to 200:
- To return to the **Main menu**, press (MENU) once.

Saturation

Saturation is the amount of colour in the image. Decrease this setting if colors are too bright; increase it if colors appear muted or washed out.

- Press ◀ or ▶ once.

After the first press, the **Saturation** adjustment bar will appear.

- Use the ◀ and ▶ keys to adjust the **Saturation** from 0 to 200:
- To return to the **Main menu**, press (MENU) once.

Hue

Hue is the ratio of red to green in the image. Decrease this setting to shift the hue toward red; increase it to shift the hue toward green.

- Press ◀ or ▶ once.

After the first press, the **Hue** adjustment bar will appear.

- Use the ◀ and ▶ keys to adjust the **Hue** from 0 to 200:
- To return to the **Main menu**, press (MENU) once.

Notes

To exit from the menus completely, you may need to press (MENU) up to three times.

Image changes made using the menus will take effect immediately.

Image changes made using the menus will take effect immediately.

Some menu items may be greyed out - unavailable due to the effect of settings made in other menus, or due to the type of input signal.

Image quality settings are often interactive - a change in one setting may require a change to be made in another setting.

Setting Adaptive Contrast to On in the Advanced menu will affect any image quality settings made in other menus.

Main menu continued

Sharpness

- Press ◀ or ▶ once.

  After the first press, the **Sharpness** adjustment bar will appear.

- Use the ◀ and ▶ keys to adjust the **Sharpness** from 0 to 200:

- To return to the **Main menu**, press (MENU) once.

Noise Reduction

- Press ◀ or ▶ once.

  After the first press, the **Noise reduction** adjustment bar will appear.

- Use the ◀ and ▶ keys to adjust the **Noise reduction** from 0 to 200:

- To return to the **Main menu**, press (MENU) once.

Overscan

Some television programs are produced based on the assumption that older television sets may not display the outer edges of the broadcast picture area. Consequently the edges of the image may be noisy or badly defined. Overscan is used to compensate for this, by hiding the outer edges of the image.

- Use the ◀ or ▶ keys to select from:

  Off

  Crop blanks a 3% border from the left and right edges of the image

  Zoom increases the horizontal and vertical resolution of the displayed image by 6%, so that the all four edges fall outside the screen area

Notes

To exit from the menus completely, you may need to press (MENU) up to three times.

Image changes made using the menus will take effect immediately.

Some menu items may be greyed out - unavailable due to the effect of settings made in other menus, or due to the type of input signal.

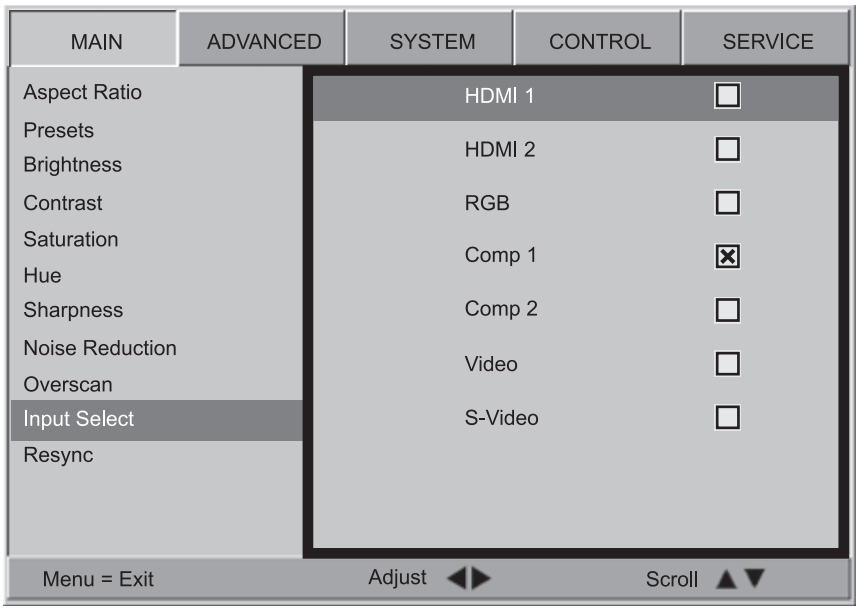
When the **Aspect Ratio** *is set to* **Native**, **Overscan** *can only be set to* **Off** *or* **Crop**

Main menu continued

Input Select

- Press ENTER or SELECT.

  The **Input select** submenu will appear:



- Use the ▲ and ▼ keys to select from:

  HDMI 1

  HDMI 2

  RGB

  Component 1

  Component 2

  Video

  S-Video

- Press ENTER or SELECT, to select a different input source.
- To return to the **Main menu**, press MENU once.

Resync

If the image has become unstable or degraded, it may be possible to improve the display:

- Press ENTER or SELECT.

  The projector will attempt to re-synchronise to the current input source.

Notes

To select a different menu, press MENU once or twice, so that no items are highlighted, then use the ◀ and ▶ keys to select a different page.

To exit from the menus completely, you may need to press MENU up to three times.

Image changes made using the menus will take effect immediately.

Some menu items may be greyed out - unavailable due to the effect of settings made in other menus, or due to the type of input signal.

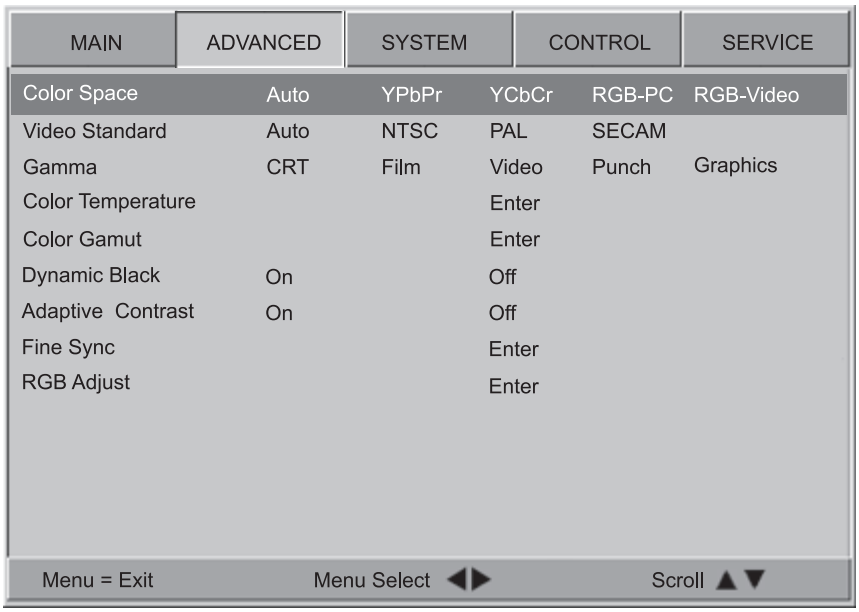
If you select a source that IS connected and active, the projector will automatically adjust to the parameters of the signal, and display it.

If you select a source that is NOT connected or active, the projector will continue searching through the input sources until it finds a valid signal, in this order.

HDMI 1, HDMI 2, RGB, Composite 1, Composite 2, Video, S-Video, HDMI 1...

Advanced menu

- To display the menus, press MENU (MENU) on the remote control or the projector control panel.
- Use the ◀ and ▶ keys to select the **Advanced menu** page,



- To select a menu item, use the ▲ and ▼ keys until the item is highlighted.

Colour Space

In most cases, the **Auto** setting will determine the correct color space to use. If it does not, you can select the appropriate setting manually.

- Use the ◀ and ▶ keys to select from:

  Auto

  YPbPr

  YCbCr

  RGB-PC

  RGB Video

Notes

To select a different menu, press MENU (MENU) once or twice, so that no items are highlighted, then use the ◀ and ▶ keys to select a different page.

To exit from the menus completely, you may need to press (MENU) up to three times.

Image changes made using the menus will take effect immediately.

Some menu items may be greyed out - unavailable due to the effect of settings made in other menus, or due to the type of input signal.

To determine what is the correct colour space to use, consult the user manual for the video source.

Advanced menu continued

Video Standard

In most cases, the **Auto** setting will determine the correct video standard to use. If it does not, you can select the appropriate setting manually.

- Use the ◀ and ▶ keys to select from:

Auto	
NTSC	used mainly in the United States and Japan
PAL	used in Europe, Australia and many other parts of the world, typically with a 50Hz frame rate
SECAM	used mainly in France and Russia

Gamma

Video recordings are often supplied with a gamma adjustment applied. The projector's gamma setting can be used to correct for this. If you are unsure, then choose a setting that gives a decent level of contrast, whilst maintaining good detail in the darkest and lightest areas of the image.

- Use the ◀ and ▶ keys to select from:

CRT	gamma of 2.5
Film	gamma of 2.2
Video	similar to Film but improves the dark areas of the image - especially suitable for images from video cameras
Punch	enhanced brightness and increased colour saturation for high ambient light environments
Graphics	enhanced highlights and contrast, especially suitable for computer presentations

Notes

To exit from the menus completely, you may need to press (MENU) *up to three times.*

Image changes made using the menus will take effect immediately.

Some menu items may be greyed out - unavailable due to the effect of settings made in other menus, or due to the type of input signal.

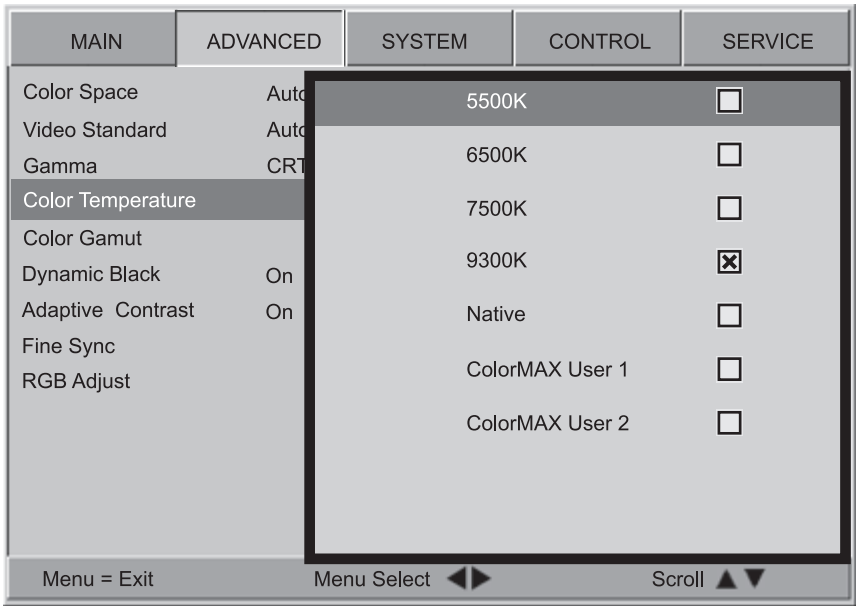
Image quality settings are often interactive - a change in one setting may require a change to be made in another setting.

Advanced menu continued

Colour Temperature

In general, a higher colour temperature gives a cooler feeling to the image, and a lower temperature gives a warmer feeling.

- Press ENTER or SELECT to see the **Color Temperature** submenu:



- Use the ▲ and ▼ keys to select from:

5500K

6500K

7500K

9300K

Native

ColorMAX User 1 Applies the Colour Temperature settings made externally using the DP Userware on a personal computer

ColorMAX User 2 Applies the Colour Temperature settings made externally using the DP Userware on a personal computer

Notes

To exit from the menus completely, you may need to press MENU up to three times.

Image changes made using the menus will take effect immediately.

Some menu items may be greyed out - unavailable due to the effect of settings made in other menus, or due to the type of input signal.

Advanced menu continued

Colour Gamut

In most cases, the **Auto** setting will determine the correct colour gamut to use. If it does not, you can select the appropriate setting manually.

Each setting defines the precise hue of each primary (red, green and blue) and secondary (yellow, cyan and magenta) color component used to generate the image.

- Press ENTER or SELECT to see the **Color Gamut** submenu *(similar to the Color Temperature menu shown on the previous page)*.
- Use the ▲ and ▼ keys to select from:

Auto	
SMPTE-C	for NTSC, 480i and 480p sources
EBU	for PAL, SECAM, 576i and 576p sources
REC709	for most other sources
Native	uncorrected
ColorMAX User 1	Applies the User gamma settings made externally using the DP Userware on a personal computer
ColorMAX User 2	Applies the User gamma settings made externally using the DP Userware on a personal computer

Dynamic Black®

Dynamic Black® allows for increased contrast by adjusting the black level of the image, depending on the overall brightness of the image.

- Use the ◀ and ▶ keys to select from:

On

Off

Adaptive Contrast

Adaptive Contrast expands the light and dark portions of the contrast curve of the image, depending on the mean luminance of the image.

- Use the ◀ and ▶ keys to select from:

On

Off

Notes

To exit from the menus completely, you may need to press MENU up to three times.

Image changes made using the menus will take effect immediately.

Some menu items may be greyed out - unavailable due to the effect of settings made in other menus, or due to the type of input signal.

It is best to turn the Dynamic Black setting Off before adjusting the brightness., contrast or image quality settings.

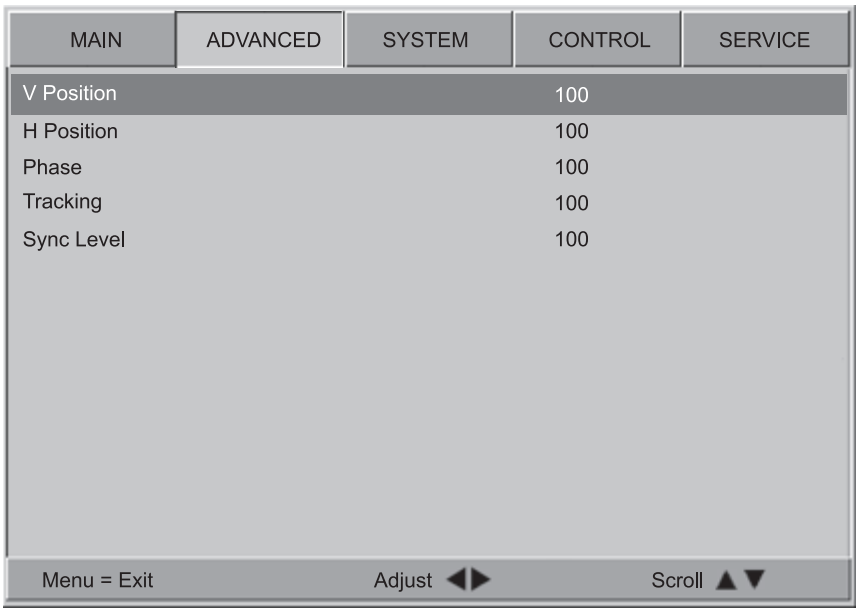
Setting Adaptive Contrast to On will affect any image quality settings made in other menus.

Advanced menu continued

Fine Sync

- Press ENTER or SELECT.

  The **Fine Sync** submenu will appear:



- Use the ▲ and ▼ keys to select from:

  V Position fine tunes the vertical position of the image

  H Position fine tunes the horizontal position of the image

  Tracking adjusts the frequency of the pixel sampling clock, so that all pixels generated by the video source are sampled. Steady flickering or several soft vertical stripes or bands across the entire image indicate poor pixel tracking.

  Phase adjusts the phase of the pixel sampling clock relative to the incoming signal. Adjust the phase when an RGB or Component image still shows shimmer or noise after the **tracking** has been optimized.

  Sync Level **a**djusts the voltage level of the projector's sync signal detection circuitry. Sync Level adjustment is occasionally necessary when a signal source signal drops "below black" (for example, during scenes with explosions or when subtitles are present) and causes the projector to temporarily lose sync.

- Use the ◀ and ▶ keys to adjust the setting from 0 to 200.

- To return to the **Advanced menu**, press (MENU) once.

Notes

To select a different menu, press MENU (MENU) once or twice, so that no items are highlighted, then use the ◀ and ▶ keys to select a different page.

To exit from the menus completely, you may need to press (MENU) up to three times.

Image changes made using the menus will take effect immediately.

Some menu items may be greyed out - unavailable due to the effect of settings made in other menus, or due to the type of input signal.

A good way to carry out tracking and phase adjustments is to use the grey scale test pattern.

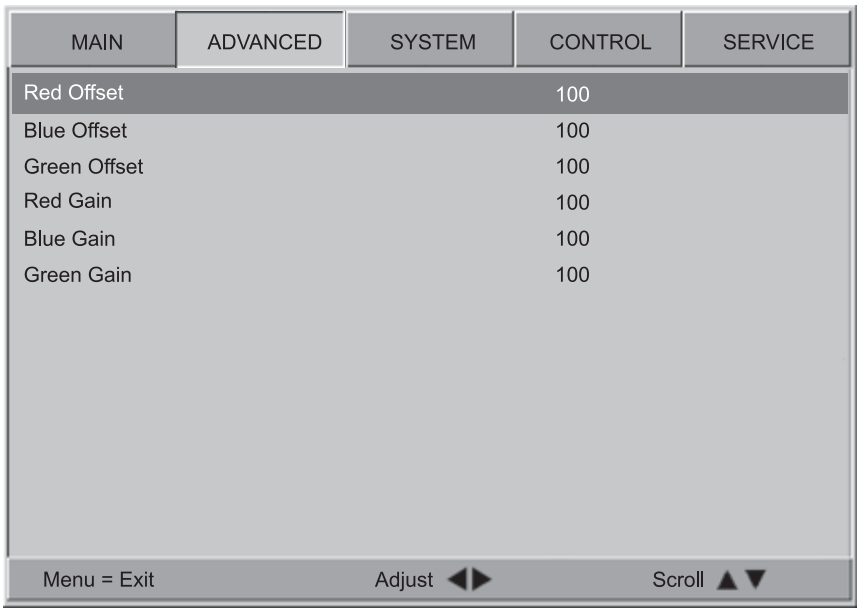
Always adjust the **tracking** *before adjusting the* **phase**

Advanced menu continued

RGB Adjust

- Press ENTER or SELECT.

  The **RGB Adjust** submenu will appear:



Use the Gain controls to correct color imbalances in the bright areas of the image. Use the Offset controls in the RGB Adjust sub-menu to correct color imbalances in the dark areas of the image.

- Use the ▲ and ▼ keys to select from:

  Red Offset

  Blue Offset

  Green Offset

  Red Gain

  Blue Gain

  Green Gain

Offsets

- Use the ◀ and ▶ keys to adjust the **Offset** from 0 to 200.

Gains

- Use the ◀ and ▶ keys to adjust the **Gain** from 0 to 200.

- To return to the **Advanced menu**, press (MENU) once.

Notes

To select a different menu, press MENU (MENU) once or twice, so that no items are highlighted, then use the ◀ and ▶ keys to select a different page.

To exit from the menus completely, you may need to press (MENU) up to three times.

Image changes made using the menus will take effect immediately.

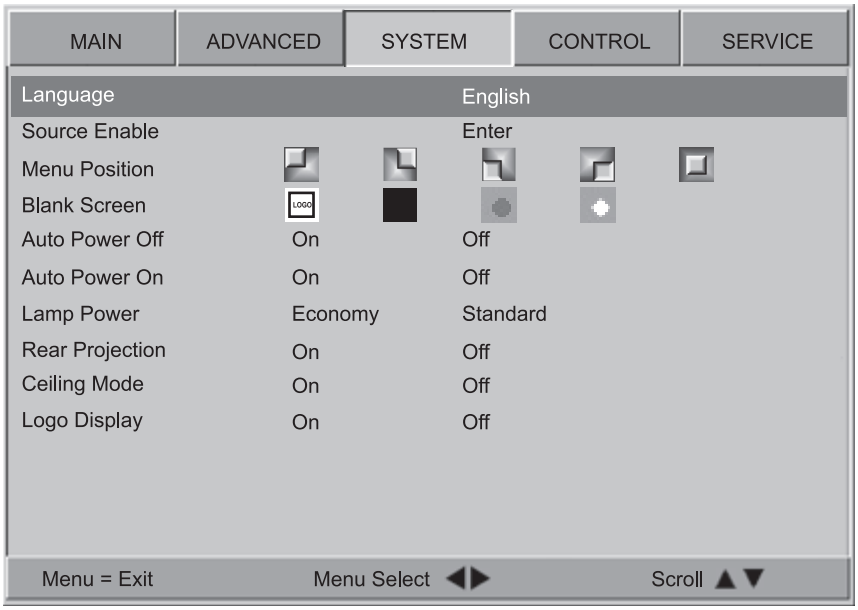
Some menu items may be greyed out - unavailable due to the effect of settings made in other menus, or due to the type of input signal.

A good way to carry out this adjustment is to use the chequerboard test pattern.

RGB settings are interactive - a change in one setting may require a change to be made in the other.

System menu

- To display the menus, press MENU (MENU) on the remote control or the projector control panel.
- Use the ◀ and ▶ keys to select the **System menu** page,



- To select a menu item, use the ▲ and ▼ keys until the item is highlighted.

Language

This product is available only in English at present.

Notes

To select a different menu, press MENU (MENU) once or twice, so that no items are highlighted, then use the ◀ and ▶ keys to select a different page.

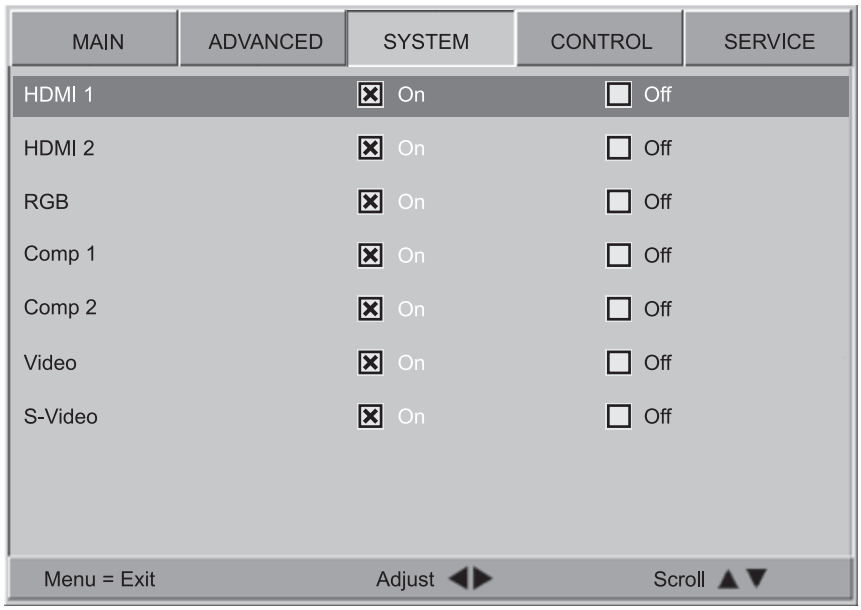
To exit from the menus completely, you may need to press (MENU) up to three times.

System menu continued

Source Enable

- Press ENTER or SELECT.

  The **Source Enable** submenu will appear:



- Use the ▲ and ▼ keys to select from:

  HDMI 1

  HDMI 2

  RGB

  Component 1

  Component 2

  Video

  S-Video

- For each source, use the ◀ and ▶ keys to select from:

  On the selected source will be included in an automatic input source search

  Off the selected source will not be included in an automatic input source search

- To return to the **System** menu, press MENU (MENU) once.

Notes

To select a different menu, press MENU (MENU) once or twice, so that no items are highlighted, then use the ◀ and ▶ keys to select a different page.

To exit from the menus completely, you may need to press (MENU) up to three times.

System menu continued

Menu Position

- Use the ◀ and ▶ keys to select from:

  Top left

  Top right

  Bottom left

  Bottom right

  Centre

Blank Screen

This option determines what appears on screen when the projector is searching for a valid input source.

- Use the ◀ and ▶ keys to select from:

  Digital Projection logo

  Black screen

  Blue screen

  White screen

Auto Power On

- Use the ◀ and ▶ keys to select from:

  On When power is connected, the projector starts up imediately.

  Off When power is connected, the projector goes into Standy mode, and does not start until POWER ON [I] on the remote control or POWER ⏻ on the projector control panel is pressed.

Auto Power Off

When the projector is searching for a valid input source, this option determines what appears on screen.

- Use the ◀ and ▶ keys to select from:

  On The projector automatically goes into Standby mode if no input source is detected for 20 minutes.

  Off The projector stays on until POWER OFF [⏻] on the remote control or POWER ⏻ on the projector control panel is pressed.

Notes

To exit from the menus completely, you may need to press (MENU) up to three times.

Image changes made using the menus will take effect immediately.

System menu continued

Lamp Power

In Economy mode, the lamp will be run at approximately 20% lower power level. This will prolong the life of the lamp, but decrease brightness.

- Use the ◀ and ▶ keys to select from:

  Economy

  Standard

Rear Projection

- Use the ◀ and ▶ keys to select from:

  On Projected image is reversed, left to right

  Off

Ceiling Mode

- Use the ◀ and ▶ keys to select from:

  On Projected image is reversed, top to bottom

  Off

Logo Display

- Use the ◀ and ▶ keys to select from:

  On The Digital Projection logo is displayed during power up

  Off

Notes

The Lamp Power setting will be saved with the other user settings when Save Presets is used.

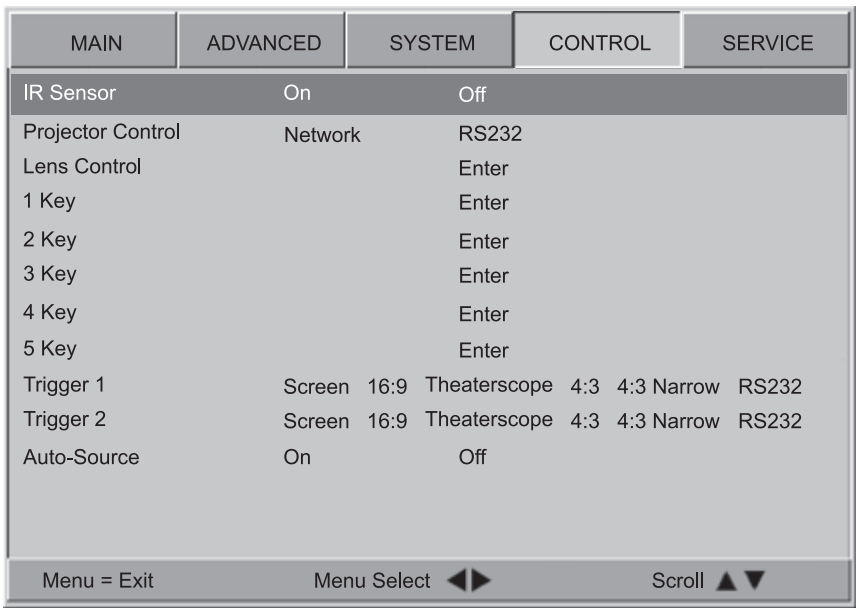
For more information about Presets, see Main Menu, earlier in this section.

To exit from the menus completely, you may need to press (MENU) *up to three times.*

Image changes made using the menus will take effect immediately.

Control menu

- To display the menus, press MENU (MENU) on the remote control or the projector control panel.
- Use the ◀ and ▶ keys to select the **Control menu** page,



- To select a menu item, use the ▲ and ▼ keys until the item is highlighted.

IR Sensor

- Use the ◀ and ▶ keys to select from:

On the remote control is enabled

Off the remote control is disabled

Projector Control

- Use the ◀ and ▶ keys to select from:

Network the projector can be controlled by remote commands from the LAN input

RS232 the projector can be controlled by remote commands from the RS232 input

Notes

To select a different menu, press MENU (MENU) once or twice, so that no items are highlighted, then use the ◀ and ▶ keys to select a different page.

To exit from the menus completely, you may need to press (MENU) up to three times.

Once the IR Sensor has been disabled, it can be re-enabled by using the control keys, or by sending a remote command via RS232 or LAN.

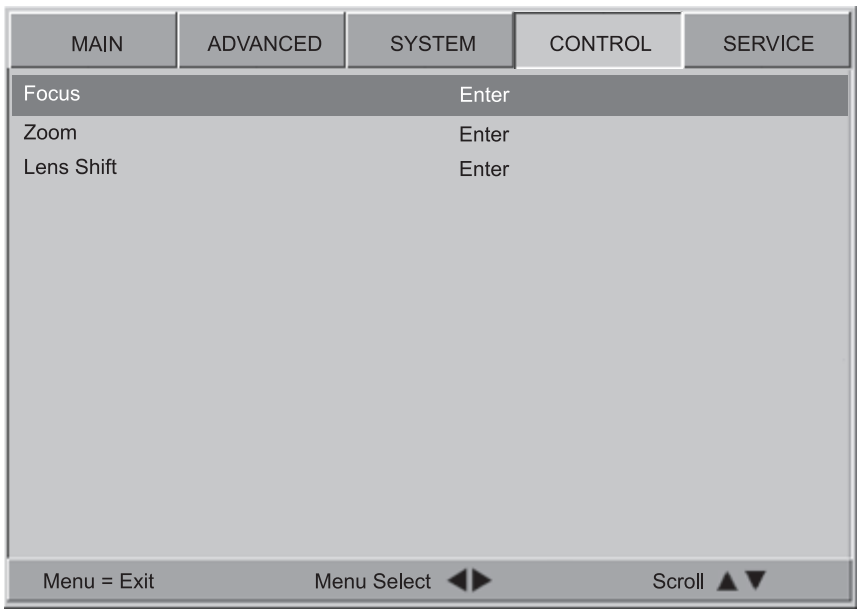
For more information about remote commands, see **Remote communications protocol** *in* **section 6. Appendix**.

Control menu continued

Lens Control

- Press ENTER or SELECT.

  The **Lens** submenu will appear:



- Use the ▲ and ▼ keys to select from:

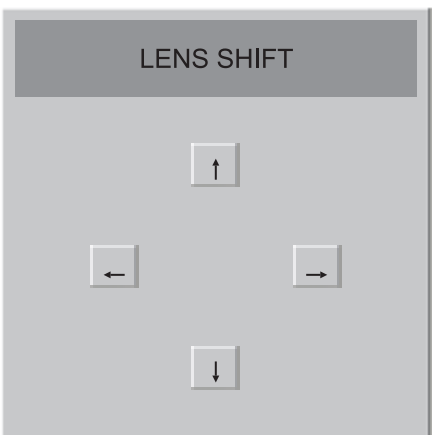
  Focus

  Zoom

  Lens Shift

- Press ENTER or SELECT to activate the lens control.
- Use the use the ▲, ▼, ◀ and ▶ keys to adjust the lens.

Example - Lens Shift control:



Notes

To select a different menu, press MENU (MENU) once or twice, so that no items are highlighted, then use the ◀ and ▶ keys to select a different page.

To exit from the menus completely, you may need to press (MENU) up to three times.

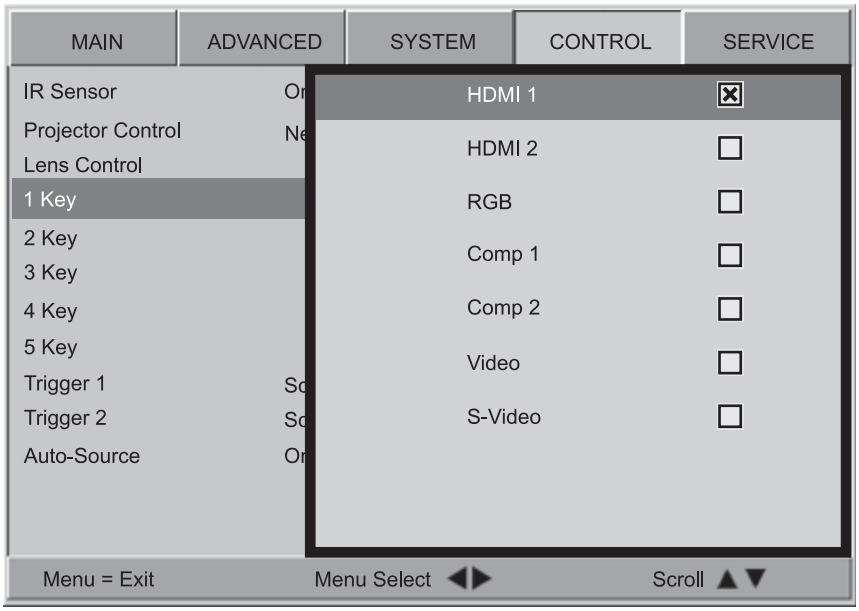
Control menu continued

Keys 1 to 5

The [1] to [5] keys on the remote control can each be programmed to switch to one of the seven input sources.

- Use the ▲ and ▼ keys to select a **Key**, then press ENTER or SELECT.

  The **Key** submenu will appear:



- Use the ▲ and ▼ keys to select from:

  HDMI 1

  HDMI 2

  RGB

  Component 1

  Component 2

  Video

  S-Video

- Press ENTER or SELECT to confirm your selection.
- Press MENU (MENU) to return to the **Control** menu and select another key.

Notes

To select a different menu, press MENU (MENU) once or twice, so that no items are highlighted, then use the ◀ and ▶ keys to select a different page.

To exit from the menus completely, you may need to press (MENU) up to three times.

If a source has been disabled in the **System** *menu, then a key programmed with that source will have no effect.*

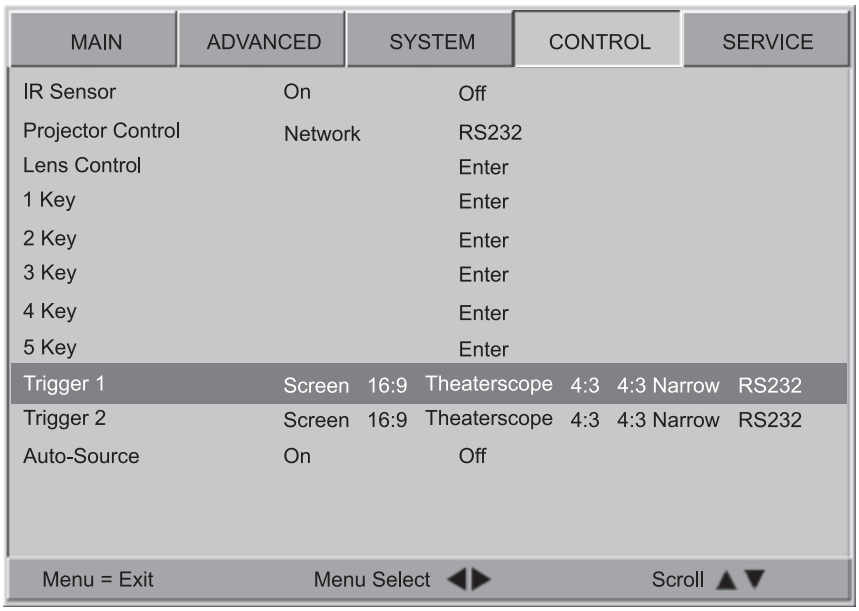
Control menu continued

Trigger 1 & 2

The Trigger 1 and Trigger 2 outputs are interchangeable:

Screen trigger: can be connected to an electrically operated screen, automatically deploying the screen when the projector starts up, and retracting the screen when the projector shuts down.

Aspect Ratio trigger: can be used to control screen shuttering for different aspect ratios



- For each **Trigger setting**, use the ◀ and ▶ keys to select from:

Screen trigger occurs when the projector is in RUNNING mode

16:9 trigger occurs when 16:9 aspect ratio is selected

Theaterscope trigger occurs when Theaterscope aspect ratio is selected

4:3 trigger occurs when 4:3 aspect ratio is selected

4:3 Narrow trigger occurs when 4:3 Narrow aspect ratio is selected

RS232 trigger output follows the **On** or **Off** setting specified in a **trig.1** or **trig.2** command received from a PC via the LAN or RS232 serial input.

Auto Source

- Use the ◀ and ▶ keys to select from:

On projector searches for an alternative input source when the current input source is disconnected

Off projector shows a 'blank' screen when the current input source is disconnected.

Notes

To select a different menu, press MENU (MENU) once or twice, so that no items are highlighted, then use the ◀ and ▶ keys to select a different page.

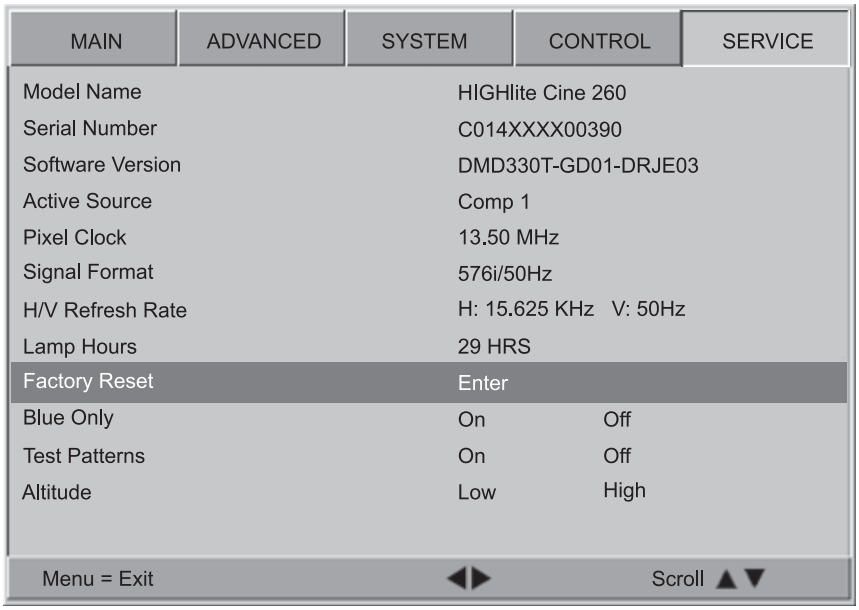
To exit from the menus completely, you may need to press (MENU) up to three times.

For more information about the trigger output, see **Control connections** *in* **section 6. Appendix**.

To set what a 'blank' screen looks like, use the **Blank Screen** *setting in the* **System menu**.

Service menu

- To display the menus, press MENU (MENU) on the remote control or the projector control panel.
- Use the ◀ and ▶ keys to select the **Service menu** page,



The first eight items are for information only, and cannot be changed.

- To select a menu item, use the ▲ and ▼ keys until the item is highlighted.

Factory Reset

- Press ENTER or SELECT to request a Factory Reset.

  The following message will be displayed.

- Use the ◀ and ▶ keys to select from:

  Yes all settings will be restored to factory defaults

  No

  Press ENTER or SELECT to confirm your choice.

Notes

To select a different menu, press MENU (MENU) once or twice, so that no items are highlighted, then use the ◀ and ▶ keys to select a different page.

To exit from the menus completely, you may need to press (MENU) up to three times.

Restore Defaults will restore all settings to factory defaults.

If you are not sure this is what you want to do, then either:

make a record of all settings first

or
select **No**, then press ENTER or SELECT

Service menu continued

Blue Only

This is useful for color-calibrating the projector or other video components.

- Use the ◀ and ▶ keys to select from:

  On only the blue signal is displayed - green and red are turned off

  Off all three signals - red, green and blue - are displayed

Test Patterns

- Use the ◀ and ▶ keys to select from:

  Test Pattern Off

  White

  Black

  Red

  Green

  Blue

  Cyan

  Magenta

  Yellow

  Chequerboard

  Greyscale

  Alignment grid

- To turn the test pattern **Off**, press any other key.

Altitude

For use at high altitudes where the air is thinner, the fan speed can be increased.

- Use the ◀ and ▶ keys to select from:

  Low normal speed fan

  High high speed fan

Notes

To exit from the menus completely, you may need to press (MENU) *up to three times.*

Image changes made using the menus will take effect immediately.

Some menu items may be greyed out - unavailable due to the effect of settings made in other menus, or due to the type of input signal.

If the projector frequently overheats when used in a high altitude environment, then it may help to use the High Altitude setting.

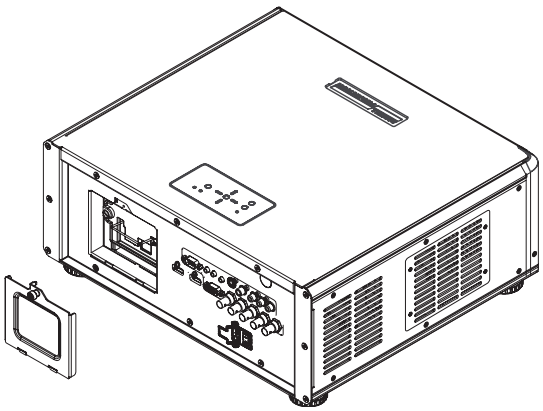
In most cases, the Low Altitude setting should be satisfactory.

5. Maintenance
Contents

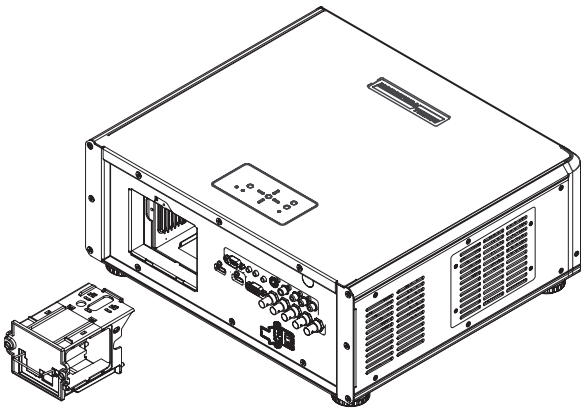
Changing the lamp module *5.2*
Cleaning the fans *5.3*
Cleaning or replacing the air filter *5.4*

Changing the lamp module

- Turn the power OFF and allow the lamp to cool for 5 minutes.
- Unscrew the captive finger screw securing the lamp door, and remove the door.



- Unscrew the two cross-head screws securing the lamp module to the projector
- Lift the wire handle up and use it to pull out the lamp module.



- Fit a new lamp module, pushing it firmly into place.
- Tighten the two cross-head screws.
- Locate the two lugs at the bottom of the lamp door into the slots, and re-fit the door. Tighten the finger screw.

Notes

Always allow the lamp to cool for 5 minutes before:
- disconnecting the power
- moving the projector
- changing the lamp

There are no user-serviceable parts inside the lamp module. The whole module should be replaced.

Only lamps supplied by Digital Projection and intended for this projector should be used. Fitting any other lamp could damage both projector and lamp, and will invalidate the warranty.

At the end of life, the lamp will not strike, and the **Issue** *indicator on the control panel will flash red. (Typical lamp life is 2000 hours)*

Do not use the lamp for more than 2000 hours, as this may cause serious lamp failure, damage the lamp module and cause extra cost on replacement.

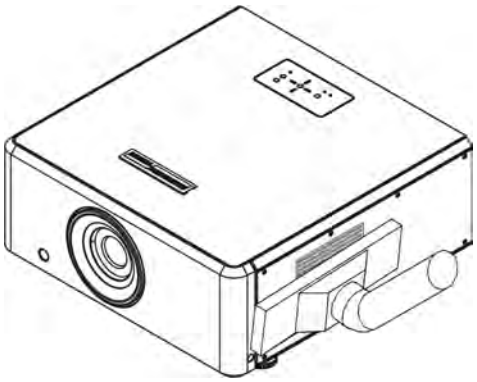
Take care not to touch the glass surface of the lamp module. If you do accidentally touch the glass, it should be cleaned before use.

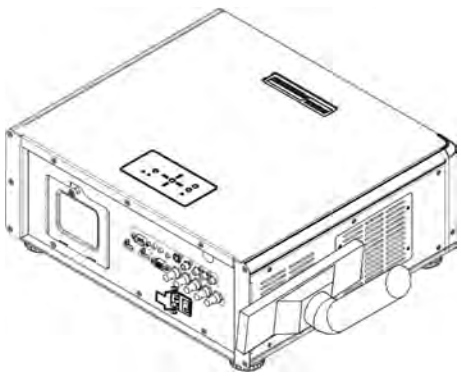
HID lamps produce high intensity light. Do not look directly at the light coming from the lamp housing or the lens.

Opening the lamp door will switch the projector OFF. The projector cannot be operated until the door is fully closed.

Cleaning the fans

- Turn the power OFF and wait until the fans stop.
- Use a vacuum cleaner to clean the inlet and outlet fans, as shown below.





Notes

Always switch the projector OFF before cleaning the fans.

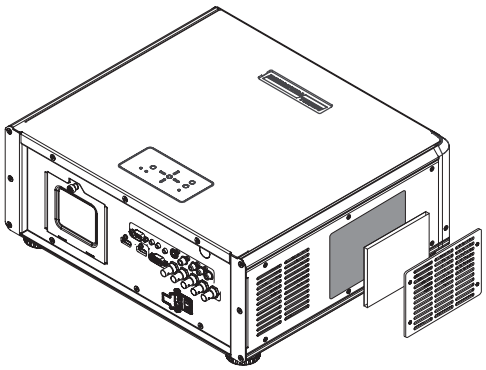
Always allow the lamp to cool for 5 minutes before:
- disconnecting the power
- moving the projector
- changing the lamp
- cleaning the fans and filter

The fans should be cleaned regularly:

- *In a clean environment such as an office, after 500 hours.*
- *In a dusty or smoky environment such as a theatre or public area, more frequent cleaning may be necessary.*

Cleaning or replacing the air filter

- Turn the power OFF and allow the lamp to cool for 5 minutes.
- Unscrew the two cross-head screws securing the filter cover to the projector
- Remove the cover and the filter.



- Clean the filter using clean water, or replace it with a new filter.
- Allow the filter to dry before reuse.
- Replace the filter, pushing it firmly into place.
- Refit the filter cover.

Notes

Always switch the projector OFF before cleaning the filter.

Always allow the lamp to cool for 5 minutes before:
- disconnecting the power
- moving the projector
- changing the lamp
- cleaning the fans and filter

The filter should be cleaned regularly:

- *In a clean environment such as an office, after 500 hours.*
- *In a dusty or smoky environment such as a theatre or public area, more frequent cleaning may be necessary.*

Allow the filter to dry before reuse.

If the filter is broken, then replace it.

6. Appendix
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Troubleshooting

Problem	*Possible solutions*
The red ISSUE indicator is illuminated continuously or flashing.	Check the Error codes detailed on the next page.
The projector will not power up.	Check that the mains plug is plugged in and that the mains supply is switched on. Check that the lamp door is closed properly. Check any external fuses or breakers.
The projector will not power up shortly after being switched off.	To protect the lamp, the projector cannot be switched on when in it is in cool-down mode. Wait until the power indicator stops flashing blue, and the standby indicator shows amber.
The projector shuts down after it has been in use for some time.	The projector may be overheating. Check that the air inlets and outlets are clear of any obstruction. See **section 5. Maintenance** It is possible to increase the speed of the fans for use in a high altitude environment: See **section 4. Controlling the projector, System menu**
No image is displayed.	See **section 5. Maintenance, Changing the lamp** Check that the input source is switched on and connected to the projector correctly. Check that the correct image source is selected. Check that the brightness and contrast settings are set correctly. See **section 4. Controlling the projector, Using the control keys and Main menu** The projector may be overheating. Check that the air inlets and outlets are clear of any obstruction.
The image does not fit the screen correctly.	Check that the projector and screen size are positioned correctly, and that the zoom is adjusted correctly. See **section 2. Installation, Screen size vs throw distance** Check the aspect ratio setting. See **section 4. Controlling the projector, Main menus**
Uneven image quality.	Check that the projector is parallel to the screen. Check that the screen is flat, and securely mounted.

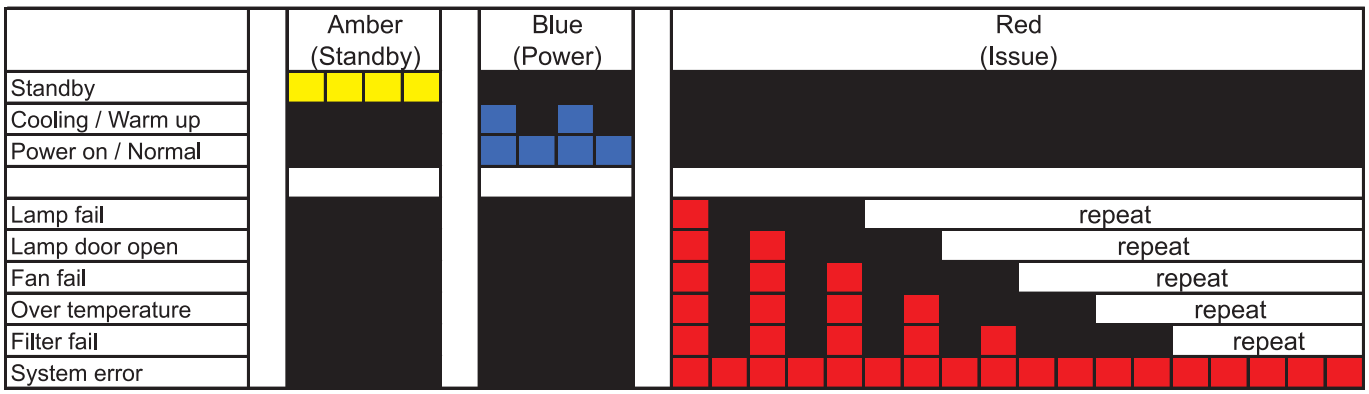
Problem	*Possible solutions*
Image is split or otherwise scrambled.	Check that the image source is not set to progressive scan.
Image is blurred.	Check that the lens is focussed correctly.
Image is too bright, and lacks definition in the bright areas.	Decrease the contrast setting. See **section 4. Controlling the projector, Using the control keys and Main menu**
Image appears 'washed out' and is too bright in the dark areas	Decrease the brightness setting. See **section 4. Controlling the projector, Using the control keys and Main menu**
Colors in the image are swapped. for example, reds appear blue or vice versa.	Check that the Component signals are connected correctly. See **Section 4. Installation, Connecting the projector**.
Projector does not respond to control commands from a computer.	Check that the LAN or serial cable is connected correctly. Check that the baud rate is set correctly (if using a serial cable). See **this section 6. Appendix, Connections** Check the Projector Control setting in the Control Menu. See **section 4. Controlling the projector, Control menu** Check that the correct control codes are being used. See **this section 6. Appendix. Serial communications protocol**
Projector does not respond to control commands from the remote control.	Check that the infra red windows at the front and rear of the projector or on the IR repeater are not obstructed. Check that the batteries are in good condition. If you are using an IR repeater, check that the cable is connected properly at both ends, and that the cable is not damaged. See **section 4. Controlling the projector, The remote control** Check the IR Sensor setting in the Control Menu. See **section 4. Controlling the projector, Control menu**
	In the event that this troubleshooting guide has not solved the problem, then contact your Digital Projection dealer or service centre.

Error codes

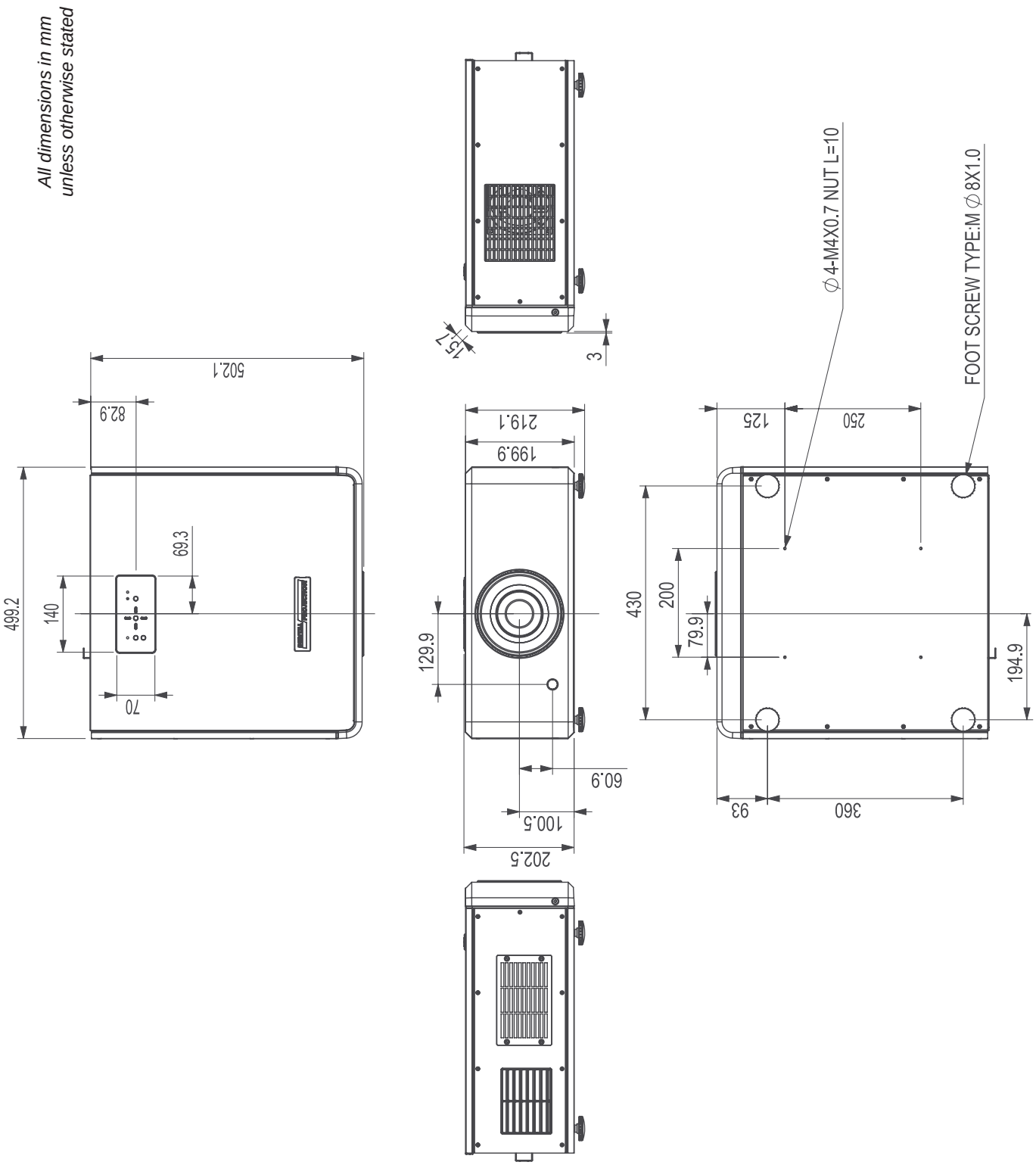
If the projector detects an error, the red Issue indicator will flash, as shown in the chart below.

For example, if the lamp door is left open, the red indicator will flash twice followed by a pause, then the sequence will repeat until the error condition is corrected.

Notes



Dimensions


All dimensions in mm
unless otherwise stated
502.1
82.9
499.2
140
69.3
70
219.1
199.9
129.9
60.9
100.5
202.5
15.7
3
Ø 4-M4X0.7 NUT L=10
FOOT SCREW TYPE:M Ø 8X1.0
125
250
430
200
79.9
194.9
93
360

Specifications

Part numbers

Projector	
Highlite 260 HB	110-509
Highlite 260 HC	110-016
HIGHlite 1080p 330	110-748
Power cable 10A, Europe	102-163
Power cable 13A, North America	102-165
Power cable 10A, United Kingdom	102-180
Remote control	110-024
User manual on CD	111-368
Important Information	111-369
Getting Started Guide	111-370
Replacement parts	
Lamp module	260 HB, HC: 110-025 1080p 330: 111-100
Air filter	111-400

Lenses	**High Brightness**	**High Contrast**
0.77 : 1 fixed lens	110-808	110-022
1.16 : 1 fixed lens	110-809	110-023
1.45 - 1.74 : 1 zoom lens	110-803	110-017
1.74 - 2.17: 1 zoom lens	110-804	110-018
2.17 - 2.9: 1 zoom lens	110-805	110-019
2.9 - 4.34: 1 zoom lens	110-806	110-020
4.34 - 6.76: 1 zoom lens	110-807	110-021

Optical

Digital Light Processor	3 x 0.65” Texas Instruments DMD™, resolution 1920 x 1080 pixels
Contrast Ratio	260 HC: 20000:1 ±10% (with HC lens and Dynamic Black) 260 HB, 1080p 330: 2000:1 ±10%
Colour temperature	Native: 6500K (±1500K), adjustable: 5500K - 9300K
Pixel fill factor	87%
Lamp power	260HB, HC: 260W 1080p 330: 330W
Lamp life (typical)	2000 hours
Brightness	260 HC: 2000 ANSI lumens ±10% 260 HB: 3500 ANSI lumens ±10% 1080p 330: 4500 ANSI lumens ±10%
Uniformity	80%

Electrical

Inputs	HDMI x 2, RGB, Component x 2, Video, S-Video
Pixel clock (digital)	up to 165MHz
Bandwidth (analog)	200MHz
Control inputs	1 x LAN 1 x RS232 serial: 38400 baud, 8 bits, 1 stop bit, no parity 1 x remote control
Indicators	Power, Standby, Issue (Fault)
Mains voltage	100-240 VAC ±10%, 47-63Hz (single phase)
Power consumption	260 HB, HC: 450W max, <2W in Standby (LAN off) 1080p 330: 500W max, <2W in Standby (LAN off)
International Regulations	Meets FCC Class B requirements Meets EMC Directives (EN 55022, EN 55024) Meets Low Voltage Directive (EN60950)

Physical

Temperature	
Operating	10 to 35°C
Storage	-20 to 60°C
Thermal Dissipation	260 HB, HC: 1536 BTU/hr max 1080p 330: 1706 BTU/hr max
Humidity	
Operating	20% to 90% non condensing
Storage	10% to 90%
Altitude	
Operating	up to 3,000 m (10,000 feet)
Storage	up to 12,000 m (40,000 feet)
Weight	20 kg (44 lbs)
Noise level	< 35 dB

Specifications are subject to change without notice.

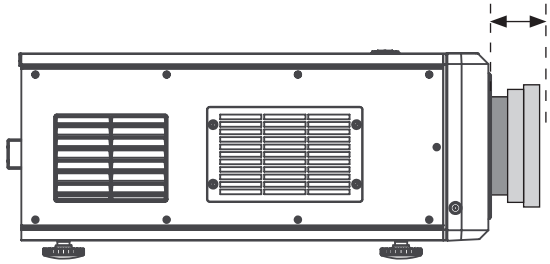
Lens Data

Optical	**110-022 ~ 110-808**	**110-023 ~ 110-809**	**110-017 ~ 110-803**	**110-018 ~ 110-804**
throw ratio	**0.77 : 1 fixed**	**1.16 : 1 fixed**	**1.45 - 1.74 :1 zoom**	**1.74 - 2.17 : 1 zoom**
full DMD image width	***0.77 : 1*** 1.69 - 3.25m (5.5 - 10.7ft)	***1.16 : 1*** 1.21 - 5.34m (4 - 17.5ft)	***1.45 : 1*** 1.24 - 5.24m (4.1 - 17.2ft) ***1.74 : 1*** 1.26 - 5.34m (4.1 - 17.5ft)	***1.74 : 1*** 1.26 - 5.46m (4.1 - 17.9ft) **2.17 *: 1*** 1.24 - 5.44m (4.1 - 17.8ft)
throw distance	***0.77 : 1*** 1.3 - 2.5m (4.3 - 8.2ft)	***1.16 : 1*** 1.4 - 6.2m (4.6 - 20.3ft)	***1.45 : 1*** 1.8 - 7.6m (5.9 - 24.9ft) ***1.74 : 1*** 2.2 - 9.3m (7.2 - 30.5ft)	**1.74 *: 1*** 2.2 - 9.5m (7.2 - 31.2ft) **2.17 *: 1*** 2.7 - 11.8m (8.9 - 38.7ft)
*lens shift vertical ** *pixels (vs DMD height)) (%)*	± 216 (± 0.2H) (40%)	± 216 (± 0.2H) (40%)	± 648 (± 0.6H) (120%)	± 648 (± 0.6H) (120%)
*lens shift horizontal ** *pixels (vs DMD width) (%)*	± 96 (± 0.05W) (10%)	± 96 (± 0.05W) (10%)	± 288 (± 0.15W) (30%)	± 288 (± 0.15W) (30%)
Aperture	F/2.5	F/2.5	F/2.5	F/2.5
Max object field size	20.1mm (0.79”)	20.1mm (0.79”)	26.4 mm (1.04”)	26.4 mm (1.04”)
Effective focal length	11.6mm (0.46in)	17.1mm (0.67in)	21.2 - 25.8mm (0.83 - 1.02in)	25.5 - 32.0mm (1.0 - 1.26in)
Distortion	<035%	<0.3%	<0.5%	<0.5%
Transmission	>85%	>85%	>85%	>85%
Mechanical				
*Lens extension*** *(±2%)*	80 mm (3.2 in)	54 mm (2.1 in)	24 mm (1.0 in)	0
Weight *±0.05 kg (±0.1lb)*	2.42 kg (5.3 lb)	1.86 kg (4.1 lb)	1.90 kg (4.2 lb)	1.47 kg (3.2 lb)

* Actual available lens shift is reduced when the lens is to be shifted in two directions combined (see **Shifting the image**, in **section 2. Installation**).

** Lens extension is the distance from the outer end of the lens to the front of the projector. It is important for calculating throw distance accurately (see Useful lens calculations, in section 2. Installation).

lens extension, measured from front of projector

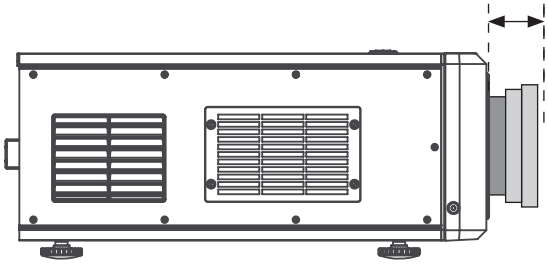


Optical	**110-019 ~ 110-805**	**110-020 ~ 110-806**	**110-021 ~ 110-807**
throw ratio	**2.17 - 2.9 : 1 zoom**	**2.9 - 4.34 : 1 zoom**	**4.34 - 4.16 : 1 zoom**
full DMD image width	***2.17 : 1*** 1.24 - 5.3m (4.1 - 17.4ft) ***2.9 : 1*** 1.28 - 5.31m (4.2 - 17.4ft)	***2.9 : 1*** 1.24 - 5.07m (4.1 - 16.6ft) ***4.34 : 1*** 1.27 - 5.18m (4.2 - 17ft)	***4.34 : 1*** 1.27 - 5.07m (4.2 - 16.6ft) ***6.76 : 1*** 1.27 - 5.18m (4.2 - 17ft)
throw distance	***2.17 : 1*** 2.7 - 11.5m (8.9 - 37.7ft) ***2.9 : 1*** 3.7 - 15.4m (12.1 - 50.5ft)	***2.9 : 1*** 3.6 - 14.7m (11.8 - 48.2ft) ***4.34 : 1*** 5.5 - 22.5m (18 - 73.8ft)	***4.34 : 1*** 5.5 - 22m (18 - 72.2ft) ***6.76 : 1*** 8.6 - 35m (28.2 - 114.8ft)
*lens shift vertical ** *pixels (vs DMD height)) (%)*	± 648 (± 0.6H) (120%)	± 648 (± 0.6H) (120%)	± 648 (± 0.6H) (120%)
*lens shift horizontal ** *pixels (vs DMD width) (%)*	± 288 (± 0.15W) (30%)	± 288 (± 0.15W) (30%)	± 288 (± 0.15W) (30%)
Aperture	F/2.5	F/2.5	F/2.5
Max object field size	26.4 mm (1.04”)	26.4 mm (1.04”)	26.4 mm (1.04”)
Effective focal length	31.9 - 42.5mm (1.26 - 1.67in)	40.8 - 62.8mm (1.61 - 2.48in)	62.1- 97.8mm (2.44 - 3.85in)
Distortion	<0.5%	<0.5%	<0.5%
Transmission	> 85 %	> 85 %	> 85 %
Mechanical			
*Lens extension*** *(±2%)*	0	0	0
Weight *±0.05 kg (±0.1lb)*	1.49 kg (3.3 lb)	1.52 kg (3.3 lb)	1.48 kg (3.3 lb)

* Actual available lens shift is reduced when the lens is to be shifted in two directions combined (see **Shifting the image**, in **section 2. Installation**).

** Lens extension is the distance from the outer end of the lens to the front of the projector. It is important for calculating throw distance accurately (see Useful lens calculations, in section 2. Installation).

lens extension, measured from front of projector



Video formats supported

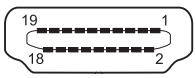
Signal Type	Resolution	Frame Rate	HDMI	RGB	Component 1: RGB	Component 1: Y/Pr/Pb Y/Cr/Cb	Component 2: Y/Pr/Pb Y/Cr	Video	S-Video	Reference
PC	640x480	59.94	x	x	x					VESA DMT
	640x480	74.99	x	x	x					VESA DMT
	640x480	85	x	x	x					VESA DMT
	800x600	60.32	x	x	x					VESA DMT
	800x600	75	x	x	x					VESA DMT
	800x600	85.06	x	x	x					VESA DMT
	848x480	47.95	x	x	x					VESA CVT
	848x480	59.94	x	x	x					VESA CVT
	1024x768	60	x	x	x					VESA DMT
	1024x768	75.03	x	x	x					VESA DMT
	1024x768	85.03	x	x	x					VESA DMT
	1024x768	70.1	x	x	x					VESA DMT
	1280x720	47.95	x	x	x					VESA GTF
	1280 x 768	60	x	x	x					VESA DMT
	1280 x 768	60	x	x	x					VESA DMT Reduced Blanking
	1280 x 768	75	x	x	x					VESA DMT
	1280 x 768	85	x	x	x					VESA DMT
	1280 x 800	50	x	x	x					VESA DMT
	1280 x 800	60	x	x	x					VESA DMT
	1280 x 800	75	x	x	x					VESA DMT
	1280x1024	60.02	x	x	x					VESA DMT
	1280x1024	75.02	x	x	x					VESA DMT
	1280x1024	85.02	x	x	x					VESA DMT
	1440 x 900	60	x	x	x					VESA DMT
	1440 x 900	75	x	x	x					VESA DMT
	1400 x 1050	60	x	x	x					VESA DMT
	1400 x 1050	75	x	x	x					VESA DMT
	1600x1200	60	x	x	x					VESA DMT
	1920x1080	47.95	x	x	x					VESA CVT
	1600 x 1200	60	x	x	x					VESA DMT
	1920 x 1200	60	x	x	x					VESA DMT Reduced Blanking
	1680x1050	59.94	x	x	x					VESA CVT
Apple Mac	640x480	66.59	x	x	x					VESA DMT
	832x624	74.54	x	x	x					VESA DMT

Signal Type	Resolution	Frame Rate	HDMI	RGB	Component 1: RGB	Component 1: Y/Pr/Pb Y/Cr/Cb	Component 2: Y/Pr/Pb Y/Cr	Video	S-Video	Reference
NTSC	NTSC (M, 4.43)	59.94						x	x	ITU-R BT.1700, SMPTE 170M
PAL	PAL (B,G,H,I)	50						x	x	ITU-R BT.1700
	PAL (N)	50						x	x	ITU-R BT.1700
	PAL (M)	59.94						x	x	ITU-R BT.1700
SECAM	SECAM (M)	50						x	x	ITU-R BT.1700
	480i	59.94	x			x	x			SMPTE 125M, CEA-861-D
	576i	50	x			x	x			ITU-R BT.601, CEA-861-D
EDTV	480p	59.94	x	x	x	x	x			SMPTE 293M, CEA-861-D
	576p	50	x	x	x	x	x			ITU-R BT.1358, CEA-861-D
HDTV	1035i	60	x	x	x	x	x			SMPTE 260M
	1080i	50	x	x	x	x	x			SMPTE 274M, CEA-861-D
	1080i (Aus)	50	x	x	x	x	x			SMPTE 295M
	1080i	59.94	x	x	x	x	x			SMPTE 274M, CEA-861-D
	1080i	60	x	x	x	x	x			SMPTE 274M, CEA-861-D
	720p	50	x	x	x	x	x			SMPTE 296M, CEA-861-D
	720p	59.94	x	x	x	x	x			SMPTE 296M, CEA-861-D
	720p	60	x	x	x	x	x			SMPTE 296M, CEA-861-D
	1080p	23.98	x	x	x	x	x			SMPTE 274M, CEA-861-D
	1080p	24	x	x	x	x	x			SMPTE 274M, CEA-861-D
	1080p	25	x	x	x	x	x			SMPTE 274M, CEA-861-D
	1080p	29.97	x	x	x	x	x			SMPTE 274M, CEA-861-D
	1080p	30	x	x	x	x	x			SMPTE 274M, CEA-861-D
	1080p	50	x	x	x	x	x			SMPTE 274M, CEA-861-D
	1080p	59.94	x	x	x	x	x			SMPTE 274M, CEA-861-D
	1080p	60	x	x	x	x	x			SMPTE 274M, CEA-861-D

Input connections

HDMI 1 & 2 inputs

19 way type A connector



pin view of panel connector

1 TMDS Data 2+
2 TMDS Data 2 Shield
3 TMDS Data 2-
4 TMDS Data 1+
5 TMDS Data 1 Shield
6 TMDS Data 1-
7 TMDS Data 0+
8 TMDS Data 0 Shield
9 TMDS Data 0-
10 TMDS Clock+
11 TMDS Clock Shield
12 TMDS Clock-
13 CEC
14 not connected
15 SCL (DDC Clock)
16 SCA (DDC Data)
17 DDC/CEC Ground
18 +5 V Power
19 Hot Plug Detect

Composite video input

1 x RCA phono connector

PAL or NTSC video

S-Video input

4 pin mini-DIN

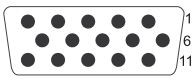
pin view of female connector

1 Y Ground
2 C Ground
3 Luminance (Y)
4 Chrominance (C)

Notes

RGB input

15 way D-type connector



pin view of female connector

1	R
2	G
3	B
4	unused
5	Digital Ground (H Sync)
6	R Ground
7	B Ground
8	G Ground
9	+5v
10	Digital Ground (V Sync/DDC)
11	unused
12	SDA
13	H Sync
14	V Sync
15	SCL

Component 1 input

3 x RCA phono connectors

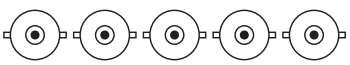
RGsB	**YPbPr**	**YCbCr**
Green + Sync	Y	Y
Blue	Pb	Cb
Red	Pr	Cr

RGBS

connect Sync to Video input

Component 2 input

5 x 75 ohm BNC



RGBHV	**RGsB**	**YPbPr**	**YCbCr**
Green	Green + Sync	Y	Y
Blue	Blue	Pb	Cb
Red	Red	Pr	Cr
Hsync			
Vsync			

Notes

In most cases, the Auto setting will determine the correct color space to use. If it does not, you can select the appropriate setting manually.

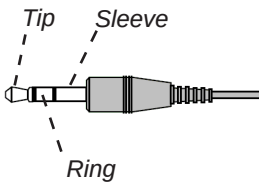
To select between RGB and YPrPb signals, see Advanced Menu, in 4.Controlling the Projector.

Control connections

Wired Remote control connection

3.5mm mini jack

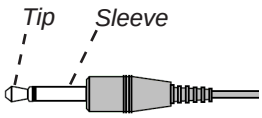
Tip	Power
Ring	Signal
Sleeve	Ground



Trigger 1 & 2 output

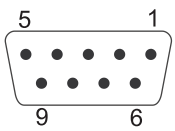
3.5mm mini jack

Tip	Signal
Sleeve	Ground



Serial control input

1 unused
2 Received Data (RX)
3 Transmitted Data (TX)
4 unused
5 Signal Ground
6 unused
7 unused
8 unused
9 unused



pin view of female connector

Null-modem cable

(used to connect the projector to a modem)

RX	2	---	3	TX
TX	3	---	2	RX
GND	5	---	5	GND

Serial port settings

- Baud rate 38400 bps
- Data length 8 bits
- Stop bits one
- Parity none
- Flow control none

Notes

Trigger outputs are normally at 0V, and rise to +12V when triggered.

All of the projector's features can be controlled using an external control system, or a PC using a terminal-emulation program such as HyperTerminal, via a serial or LAN connection. This is done by using the text strings described in **Remote communications protocol***, later in this section.*

Only one remote connection (RS232 or LAN) can be used at any one time.

The projector is a DCE, so use:

- *a straight cable to connect to a computer, or*
- *a null-modem cable as shown here to connect to another DCE such as a modem.*

LAN connection

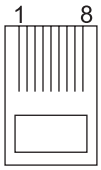
TCP Port number
7000

Default IP address
192.168.0.100

10BaseT Unshielded Twisted Pair cable

The standard wire colours as as follows:

1 White / Orange stripe
2 Orange
3 White / Green stripe
4 Blue
5 White / Blue stripe
6 Green
7 White / Brown stripe
8 Brown



top view of cable connector (clip is underneath)

Crossed cable

(used to connect directly to a computer with no hub or network.)
(Note that only the green and orange pairs are crossed)

1	White / Orange stripe	White / Green stripe	1
2	Orange	Green	2
3	White / Green stripe	White / Orange stripe	3
4	Blue	Blue	4
5	White / Blue stripe	White / Blue stripe	5
6	Green	Orange	6
7	White / Brown stripe	White / Brown stripe	7
8	Brown	Brown	8

Notes

All of the projector's features can be controlled using an external control system, or a PC using a terminal-emulation program such as HyperTerminal, via a serial or LAN connection. This is done by using the text strings described in **Remote communications protocol**, *later in this section.*

More detailed LAN IP configuration can be carried out using a web browser. For more information about this, see **Setting the LAN IP configuration** *later in this section.*

Only one remote connection (RS232 or LAN) can be used at any one time.

Use:

- *a straight cable to connect to a hub or network, or*
- *a crossed cable as shown here to connect ONLY to a computer directly.*

Remote communications protocol

Introduction

All of the projector's features can be controlled using an external control system, or a PC using a terminal-emulation program such as HyperTerminal, via a serial or LAN connection. This is done by using the text strings described in **Remote communications protocol**, in **section 6. Appendix**.

There are 2 types of commands:

- Key commands
- Operation commands

All commands consist of ascii text strings starting with 2 letters:

- ky for key commands.
- op for operations commands.

All commands end with an ascii Carriage Return character.

Notes

Details of how to connect to the projector, using the serial control input, can be found earlier in this section.

Key Commands

Key commands are used to simulate remote control key presses, and use the following format:

ky <keyname> [CR]

Example

ky pow.on [CR] simulates the POWER ON key being pressed.

Note: spaces in the commands are necessary.

eg ky pow.on
NOT kypow.on

The commands

Code transmitted	<keyname>		Description
0x01	pow.on	I	Turn power on.
0x09	pow.off	⏻	Turn power off.
0x15	menu	MENU	Bring up or cancel menu display.
0x17	enter	ENTER	Keypad enter.
0x18	cur.down	▼	Keypad down arrow.
0x1A	cur.up	▲	Keypad up arrow.
0x1D	cur.left	◀	Keypad left arrow.
0x1F	cur.righ	▶	Keypad right arrow.
0x80	bright	☼	Bring up or cancel brightness slide bar.

Code transmitted	<keyname>		Description
0x81	contrast	◐	Bring up or cancel contrast slide bar.
0x82	sharp	SHARP	Bring up or cancel sharpness slide bar.
0x83	nr	NR	Bring up or cancel noise reduction slide bar.
0x85	gam.sw	GAMMA	Switch to the next gamma value.
0x8B	src.1	1	Switch the active source to source 1.
0x8C	src.2	2	Switch the active source to source 2.
0x8D	src.3	3	Switch the active source to source 3.
0x8E	src.4	5	Switch the active source to source 4.
0x8F	src.5	5	Switch the active source to source 5.
0x93	osc.sw	O-SCAN	Switch to the next Overscan mode.
0x98	mem.1	A	Recall user memory associated with the User Memory A key.
0x99	mem.2	B	Recall user memory associated with the User Memory B key.
0x9A	mem.3	C	Recall user memory associated with the User Memory C key.
0x9D	asp.sw	ASPECT RATIO	Switch to the next aspect ratio setting.
0xA3	lens.sw	LENS	Bring up or cancel the lens control menu.
0xAA	ctemp.sw	C-TEMP	Switch to the next colour temperature value.
0xAD	pattern.sw	TEST	Switch to the next test pattern.

Operation Commands

Operation commands are used to simulate menu operations and determine the settings of the projector, and use the following format:

op <operation> <command> [CR]

The <command> string can take one of the following formats:

	<command>	**Description**
Set	= <value>	Makes the setting take that value.
Get	?	Asks what the current value is. The value is returned as an ascii text string.
Increment	+	Adds 1 to the current value.
Decrement	-	Subtracts 1 from the current value.
Execute	(none)	Performs an action.

Example

op aspect = 1 [CR] sets the aspect ratio to Theaterscope.

op aspect ? [CR] asks what is the current aspect ratio.

op bright + [CR] increments the brightness setting.

op resync [CR] commands the projector to attempt to re-synchronise to the current input source.

Notes

Note: spaces in the commands are necessary.

eg *op aspect = 1*
NOT *opaspect=1*

The commands

Operation	**<command>**	**Values**	**Notes**
aspect	= ?	0 = 16:9 1 = Theaterscope 2 = 4:3 3 = 4:3 Narrow 4 = Native	
memory	= ?	0 = Preset A 1 = Preset B 2 = Preset C 3 = Preset D 4 = Default	
save.mem	=	0 = Preset A 1 = Preset B 2 = Preset C 3 = Preset D	
bright	= ? + -	0 - 200	
contrast	= ? + -	0 - 200	
saturat	= ? + -	0 - 200	
tint	= ? + -	0 - 200	
sharp	= ? + -	0 - 200	
nr	= ? + -	0 - 200	
overscan	= ?	0 = Off 1 = Crop 2 = Zoom	

Operation	<command>	Values	Notes
source.sel	= ?	0 = HDMI 1 1 = HDMI 2 2 = RGB 3 = YPrPb 1 4 = YPrPb 2 5 = S-Video 6 = Video	
resync	(execute)		
color.space	= ?	0 = Auto 1 = YPbPr (= REC709) 2 = YCbCr (= REC601) 3 = RGB-PC 4 = RGB-Video	
video.stand	= ?	0 = Auto 1 = NTSC 2 = PAL 3 = SECAM	
gamma	= ?	0 = CRT 1 = Film 2 = Video 3 = Punch 4 = Graphics	
color.temp	= ?	0 = 5500K 1 = 6500K 2 = 7500K 3 = 9300K	
dlp.frame	= ?	0 = Auto 2 = 48 Hz 3 = 50 Hz 4 = 60 Hz	
color.gamut	= ?	0 = Auto 1 = REC709 2 = SMPTE C 3 = EBU 4 = Native	
red.off	= ? + -	0-200	
green.off	= ? + -	0-200	
blue.off	= ? + -	0-200	
red.gain	= ? + -	0-200	
green.gain	= ? + -	0-200	
blue.gain	= ? + -	0-200	
vert.pos	= ? + -	0-200	
horiz.pos	= ? + -	0-200	
phase	= ? + -	0-200	
tracking	= ? + -	0-200	
sync.level	= ? + -	0-200	
menu.pos	= ?	0 = Top left 1 = Top right 2 = Bottom left 3 = Bottom right 4 = Centre	

Operation	<command>	Values	Notes
blank.screen	= ?	0 = Logo 1 = Black 2 = Blue 3 = White	
auto.pow.off	= ?	0 = Off 1 = On	
auto.pow.on	= ?	0 = Off 1 = On	
rear.proj	= ?	0 = Off 1 = On	
ceil.mode	= ?	0 = Off 1 = On	
logo.disp	= ?	0 = Off 1 = On	
1.key	= ?	0 = HDMI 1 1 = HDMI 2 2 = RGB 3 = YPrPb 1 4 = YPrPb 2 5 = S-video 6 = Video	
2.key	= ?	0 = HDMI 1 1 = HDMI 2 2 = RGB 3 = YPrPb 1 4 = YPrPb 2 5 = S-video 6 = Video	
3.key	= ?	0 = HDMI 1 1 = HDMI 2 2 = RGB 3 = YPrPb 1 4 = YPrPb 2 5 = S-video 6 = Video	
4.key	= ?	0 = HDMI 1 1 = HDMI 2 2 = RGB 3 = YPrPb 1 4 = YPrPb 2 5 = S-video 6 = Video	
trig.1	= ?	0 = Screen 1 = 16:9 2 = Theaterscope 3 = 4:3 4 = 4:3 Narrow 5 = RS232 6 = On 7 = Off	0: Trigger occurs when the projector is in RUNNING mode

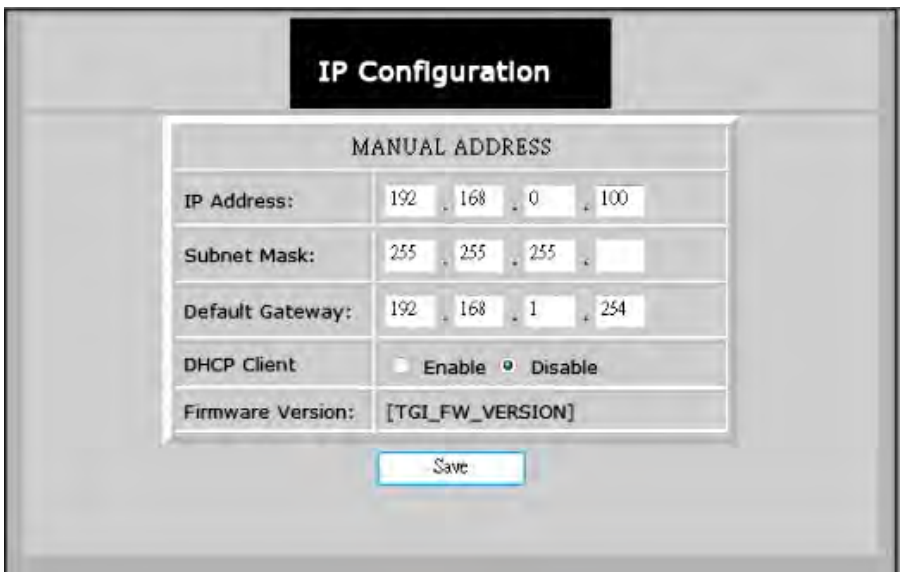
Operation	<command>	Values	Notes
trig.2	= ?	0 = Screen 1 = 16:9 2 = Theaterscope 3 = 4:3 4 = 4:3 Narrow 5 = RS232 6 = On 7 = Off	0: Trigger occurs when the projector is in RUNNING mode
auto.source	= ?	0 = Off 1 = On	
model.name	?	<string>	
ser.number	?	<string>	
soft.version	?	<string>	
act.source	?	0 = HDMI 1 1 = HDMI 2 2 = RGB 3 = YPrPb 1 4 = YPrPb 2 5 = S-video 6 = Video	Source Enable
h.refresh	?	<number>	KHz
v.refresh	?	<number>	Hz
pixel.clock	?	<number>	MHz
signal	?	<string>	
lamp.hours	?	<number>	
total.hours	?	<number>	
environment	?	<string>	Temperatures
fact.reset	(execute)		
blue.only	=	0 = Off 1 = On	
pattern	=	0 = White 1 = Black 2 = Red 3 = Green 4 = Blue 5 = Cyan 6 = Magenta 7 = Yellow 8 = Chequerboard 9 = Greyscale 10 = Alignment Grid 11 = Off	
altitude	= ?	0 = Low 1 = High	
status.check	?	0 = standby mode 1 = warm up mode 2 = running mode 3 = cooling mode 4 = error	
focus	+ -	+ Focus Near - Focus Far	

Operation	<command>	Values	Notes
zoom	+ -	+ Zoom Out - Zoom In	
vert.offset	+ -	+ Shift Up - Shift Down	
horiz.offset	+ -	+ Shift Right - Shift Left	
ir.sw	= ?	0 = Off 1 = On	IR Remote Control enable
eco.net.pow	= ?	0 = RS232 1 = LAN	Serial/LAN switch
op net.ipaddr	?	LAN IP address	Default address is 192.168.0.100 To find out how to change this, see **Setting the LAN IP configuration**, later in this section.
lamp.mode	= ?	0 = economy mode 1 = standard mode	

Setting the LAN IP configuration

More detailed LAN IP configuration can be carried out using a web browser.

- Point your browser at the projector by typing the LAN IP Address into the address bar, then press the Enter key.
- The embedded IP Configuration webpage should appear.



- Set the addresses as required, then click on Save.

Notes

The default LAN IP address is 192.168.0.100

If you suspect this has been changed, then you can find out what it has been set to using the remote communications protocol Operation Command

op net.ipaddr?